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SH-2F LAMPS INSTRUCTIONAL SYSTEMS DEVELOPMENT. PHASE II.(U)

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UNCLASSIFIED NAVTRAEQUIPC-76-C-0055-1 NL

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LEVEL II

Technical Report NAVTRAEQUIPCEN 76-C-0055-1

SH-2F LAMPS INSTRUCTIONAL SYSTEMS DEVELOPMENT: PHASE II FINAL REPORT

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FINAL REPORT JANUARY 1976 - SEPTEMBER 1977

March 1978

DoD DISTRIBUTION STATEMENT

Approved for public release; distribution unlimited.

NAVAL TRAINING EQUIPMENT CENTER
ORLANDO, FLORIDA 32813

NAVTRAEQUIPCEN 76-C-0055-1

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 18 19 NAVTRAEQUIPCEN 76-C-0055-1	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) 6 SH-2F LAMPS INSTRUCTIONAL SYSTEMS DEVELOPMENT, PHASE II. [redacted]		5. TYPE OF REPORT & PERIOD COVERED 9 Final Rep[redacted]t - Jan [redacted]76 - Sep [redacted]977
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) 10 Andrew S. Gibbons Jonah P. Hymes		8. CONTRACT OR GRANT NUMBER(s) 15 N61339-76-C-0055
9. PERFORMING ORGANIZATION NAME AND ADDRESS Courseware, Inc. 9820 Willow Creek Road San Diego, California 92131		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 12 297p.
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Training Equipment Center Orlando, FL 32813		12. REPORT DATE 11 Mar[redacted]978
		13. NUMBER OF PAGES 292
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Naval Training Equipment Center Orlando, FL 32813		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution is unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

ISD	Training (design; development)
SAT	Aircrew training
SH-2F	Instruction (-al design; -al development)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This project was one of four aircrew training development projects sponsored by the Naval Training Equipment Center (NAVTRAEQUIPCEN) in continuing study of the methodology, effectiveness, and resource requirements of the Instructional Systems Development process. It was a Phase II effort covering the ISD tasks from authoring through implementation and evaluation of the instructional system. Project goals were to

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Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

392 877

BLOCK 20

study the effectiveness, feasibility, and resource requirements of full-scope ISD, and to support the Fleet Readiness Squadron in its training program development efforts. Instructional materials were authored and subjected to a review process, produced in a tryout form, and subjected to a tryout with typical students. Revisions were made as appropriate to the instructional materials, following which they were produced in a form suitable for the implementation and evaluation of the entire instructional system. An evaluation plan was written to support evaluation for small-scale tryouts and for the large-scale tryout, and an implementation plan was written to prescribe the procedures and practices to be observed during management of the instructional system in actual use. When all materials had been tried out and produced in final form, the instructional system was implemented at two sites: Naval Air Station, North Island, on the West Coast, and Naval Air Station, Norfolk, on the East Coast. Data was collected on the performance of the system and on performance of the instructional materials, and revision specifications were written as necessary. An instructor training course was developed and implemented to train instructors in specific tasks attendant to implementation of the instructional system. It was concluded that the ISD model used was robust and produced instructionally effective materials. Data on personnel requirements were gathered and reported. A review of the effectiveness of the instructional development model was made on a step-by-step basis, and suggestions for the future implementation of ISD in the Navy were made.

SUMMARY

This report covers the Phase II activities of a two-phase project for development of aircrew training for SH-2F anti-submarine warfare helicopter pilots and sensor operators. The project represented an attempt to collect data on the effectiveness, feasibility, and resource requirements of instructional systems development (ISD) in the context of an operational Navy aircrew training environment. This was one of four aircrew training development projects sponsored and directed by the Naval Training Equipment Center. It took place at the Naval Air Station, North Island, San Diego, California, which is the location of the Fleet Readiness Squadron HSL-31, one of two replacement aircrew training squadrons used for the SH-2F training. This Phase II effort was the continuation of a Phase I effort in which job analysis, task analysis, media selection, sequencing, instructional design, and lesson specification writing took place. The products of that Phase I effort were applied as inputs to the Phase II effort.

Phase II contained ISD steps from authoring of instructional material through the implementation and evaluation of the materials. The specific activities of Phase II included: authoring of instructional materials, production, small-scale materials tryout, revision, large-scale implementation of the instructional system, evaluation, and revision specification writing. Two major planning phases also were performed during the project: evaluation planning and implementation planning. Each ISD procedure carried out during Phase II is described briefly below.

AUTHORING

Authoring is the process of writing the scripts, rough drafts, and data tables necessary for the production of instructional materials. Authoring was carried out by Navy subject matter experts, following lesson specifications written during the Phase I effort.

MATERIALS PRODUCTION

In this stage of development, instructional materials were produced in a form suitable for small-scale try-out.

SMALL-SCALE TRY-OUT

In this procedure, instructional materials produced in try-out form were submitted to typical students to determine if the materials were technically correct and if they were instructionally effective. Following the try-out, students were asked to respond in detail to mastery measures and attitudinal measures, and to generate specific comments about the instructional materials.

REVISION

During revision, weaknesses in the instructional materials pointed out by the students during the small-scale try-out were changed to remove the problems. Materials were then reproduced for the full scale implementation and evaluation procedure.

EVALUATION PLANNING

During evaluation planning, the plans were made, forms were designed, and data collection procedures were specified for the collection of data on the effectiveness of instructional materials. The evaluation plan specified ISD team and instructional psychologist reviews, small-scale try-out procedures, and large-scale try-out procedures.

IMPLEMENTATION PLANNING

During implementation planning, the management plan was written which described the functioning of the instructional system. It defined the procedures which would be carried out, the records to be kept, and the methods to be used in revising and updating the instructional materials and the management plan itself.

INSTRUCTOR TRAINING COURSE DEVELOPMENT AND IMPLEMENTATION

During ITC development and evaluation, a training course was created which would train instructors in their unique role as parts of the instructional system. The course was presented and evaluated at two sites.

IMPLEMENTATION AND EVALUATION

During this procedure, instructional materials were subjected to normal use after the manner prescribed in the implementation plan, with two full classes of regular students. The purpose of this try-out was to prove the effectiveness of the instructional materials themselves in regular use, and to prove the effectiveness of the implementation plan and make possible revisions in both the instructional materials and the implementation plan. The identification of needed revisions followed this try-out, with the revisions being implemented by the ISD team.

PREFACE

The Naval Training Equipment Center has a continuing interest in the application and evaluation of the methodology used in the design and development of training. Recent interest has centered on the systems approach to training, of which Instructional Systems Development (ISD) is a component. This SH-2F project was one of four such projects (EA-6B, A-6E, and E-2C Weapon Systems) begun in early 1975 by the Naval Training Equipment Center for the Naval Air Systems Command to design and develop aircrew training systems and to establish the requirements for implementation of the ISD process within Naval Air. The work was performed by Courseware, Inc., under Contract N61339-76-C-0055. A two-phase ISD effort was planned. Phase II is described in this report.

The operational objectives were to develop an aircrew training program using the ISD process, to evaluate the new training program, to design a training program that permits revision as weapon system hardware is modified, and to implement an ISD instructor training program.

The research and development objectives were to evaluate a variety of ISD approaches under several operational situations, and to acquire manpower/skill types, scheduling, and cost information for future ISD planning.

Appreciation is expressed to those personnel of HSL-31, HSL-30, COMNAVAIRPAC, COMNAVAIRLANT, ASWWINGPAC, HELSEACONWINGONE, and NPRDC who made significant contributions to this project.

Robert G. Bird

Robert G. Bird
Scientific Officer

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SECTION I

INTRODUCTION

PROBLEM/BACKGROUND

PROBLEM SETTING. The SH-2F ISD project emerged from a fundamental need on the part of those significantly involved in Naval Air Training for information about Instructional Systems Development (ISD) -- its methods, its costs, and its feasibility. The Naval Training Equipment Cetter (NAVTRAEQUIPCEN) represented these more fundamental concerns within the Naval air community. The SH-2F effort was one of four aircrew training projects conceived, organized, and directed by NAVTRAEQUIPCEN in an attempt to answer some serious questions about ISD.

On 1 June 1975, Phase I of the project to develop an aircrew training program for the SH-2F helicopter began at the Naval Air Station, North Island, California. The project was designed to employ ISD technology in the establishment of the training program. Phase I of the project was limited to the analysis and design steps of ISD. Development, implementation, and evaluation of the final instructional program was to occur during a second, Phase II, project. The Contractor was to provide on-site ISD training and guidelines for Phase I. The Navy's helicopter anti-submarine warfare squadron number 31 (HSL-31), which is one of the two replacement aircrew training squadrons for all SH-2F aircraft, was to provide the technical subject matter input to the training development, and the on-site facilities. NAVTRAEQUIPCEN was to serve as project coordinator and monitor.

THE SH-2F TRAINING REQUIREMENT

System Description

The Aircraft. The SH-2F LAMPS helicopter is an anti-submarine warfare platform built by Kaman. The aircraft is employed on ships ranging from aircraft carriers to destroyer escorts which have been properly configured for helicopter operations. The short range of the aircraft (two hours) suits it especially for task force protection and for patrol duty.

The Mission. The primary mission of the SH-2F helicopter is anti-submarine warfare. The SH-2F is equipped with several sensor systems which can assist in detecting and tracking underwater objects.

The Crew. The SH-2F is a three-position aircraft. The pilot and copilot are cross-trained crewmen equally qualified to fly the aircraft. The copilot, when not flying the aircraft and conducting the missions, which is the pilot's job, serves as an airborne tactical officer (ATO) and assists the pilot by keeping records of the sensor equipment employed and its locations relative to the aircraft. In addition, he is usually tasked with monitoring those facets of aircraft performance and status which are delegated by the pilot. The third aircrewman, the sensor operator, operates the sensing equipment as requested by the pilot.

The Training Environment and Programs

Present SH-2F Squadron Locations. The Fleet Readiness Squadrons (FRS) and Fleet Squadrons (FS) presently operating SH-2F aircraft at NAS, North Island, on the West Coast are HSL-31 (FRS), HSL-33 (FS), and HSL-35 (FS). For the East Coast, the corresponding squadrons are HSL-30 (FRS), HSL-32 (FS), and HSL-34 (FS) operating at NAS Norfolk, Virginia. HSL-37 (FS) operates from Barbers Point, Hawaii.

It is expected in the near future that an additional fleet squadron will be formed on the East Coast. New squadrons are formed with trained personnel (pilots and sensor operators) and can be formed only as fast as these trained personnel are produced by HSL-31 and HSL-30

The data for this report were gathered from personnel assigned to HSL-31 at the Naval Air Station, North Island, Coronado, California.

Use of the SH-2F aircraft is expected to continue until at least 1985. Presently 100 airframes are in possession of the Navy, with no new airframes being made or purchased. A newer aircraft, the LAMPS Mark III, is expected to replace the SH-2F in about fiscal year 1981.

Existing HSL Training. The existing training falls under three headings: SH-2F pilot training, SH-2F sensor operator training, and SH-2F maintenance training. Only pilot and sensor operator training are within the scope of this profile. Maintenance training will not be considered.

Five categories of pilot training are offered. These categories are defined by the functions students fill upon leaving training. Students from categories I and II are capable of flying all types of SH-2F missions. Category II is reserved for SH-2F pilots retraining after assignment away from the SH-2F squadrons. Category III and IV students are trained to fly missions of transporting cargo, personnel, or VIP's. Category V students are designated commanding or executive officers of SH-2F squadrons who need training prior to assuming command.

Students from foreign countries are also placed in Category V.

Sensor operator training is of one variety only, and all students entering the course proceed through the same instructional track, regardless of prior training.

As part of the sensor operator training, instruction on search and rescue techniques is received by all students. HSL-31 on the West Coast makes this portion of the training program available to students from other helicopter communities.

SH-2F Pilot Student Sources. Pilot Students come from three sources: (1) basic helicopter pilot school at Pensacola, Florida, (2) flight assignments on helicopters other than the SH-2F, and (3) non-flight assignments such as postgraduate school, staff assignments, or recruiting billets.

The pilot training categories may be explained in terms of the student sources. Category I students, new SH-2F students meant to learn all SH-2F missions and operations, come from all three student sources. Category II pilots, those returning to SH-2F service to become all-mission pilots, come from non-flight assignments or from flying other aircraft. These students have at one time been through SH-2F pilot training and need only a refresher course. Category III students, presidential pilots, enter training from either flight or non-flight assignments. Category IV students, who will become utility pilots, come from any of the three sources. Category V students, future XOs and COs, come generally from non-flight staff assignments.

Pilot Student Entering Training. SH-2F pilot students enter training with 210 hours of total flight time in helicopters and fixed wing aircraft and 42 weeks of instruction. All are Helicopter Pilot Qualified.

Students have had experience in four phases of helicopter pilot training in Primary Pilot Training; 26 hours of flight time are accumulated over six weeks in a T34B fixed wing aircraft. In Pre-Helo Training, the student receives 20 weeks of instruction and accumulates 89 hours of flight time in the T28 fixed wing aircraft. During Primary Helo Training, 30 hours of flight in a TH-57 helicopter are accumulated over a five-week period. Finally, in Advanced Helo Training, 65 hours of flight in TH-1/UH-1 helicopters are accumulated in 11 weeks.

Fifty hours of synthetic (simulated) flight experience are accumulated during this time, and a total of 1,420 instructional hours.

SH-2F Sensor Operator Student Sources. Sensor Operator students may enter from three sources into SH-2F training. One major source of students is Navy "A" School. A second source of students is from non-helicopter sensor operator assignments, for instance, S-3A or P-3 aircraft sensor experience. A third source of students is sensor equipment electrical or electronic service rates which do not require direct operation of sensor gear. Examples of these are the electronics technician (AT), electrician (AE), or sensor technician (AX) rates. Students with these rates have not been through "A" School.

"A" School Curriculum. "A" School training consists of an 11.5 week course with 383 contact hours or instruction and 460 total instructional periods.

Training consists of two phases: (1) AW crewmember orientation (180 contact hours and 34 laboratory hours) and (2) fundamental sensor operation and techniques (203 contact hours and 91 laboratory hours).

Table 1 below lists the individual topics treated in each unit of each phase. There is no evidence on whether or not students are tested on each topic for mastery or whether testing is conducted on a general level. There is reason to believe that some of the skills and information originally learned are forgotten by students in the time elapsed between "A" school and SH-2F training.

Class Size and Frequency. Figures are given in Table 2 below concerning the frequency with which new classes for pilot and AW training begin and the number of students in each.

Note that most classes on the West Coast (HSL-31) are running considerably more slowly than specified by the syllabus. Reasons for the delay in putting students through the course are: higher than expected student input, lack of aircraft for instruction flights, and lack of secondary training equipment to relieve the burden of instructional flights. The lack of aircraft may be attributed to three conditions:

(1) Excess number of pilot students assigned to HSL-31, West Coast.

(2) Noncompatibility of the pilot and AW syllabi for flights, resulting in scheduling problems.

(3) Aircraft not outfitted with standard equipment, aggravating the scheduling problem mentioned in #2 above.

Approximately the same number of students enter HSL-30 on the East Coast, though they enter in groups of twice the size and half the frequency.

TABLE 1. "A" SCHOOL CURRICULUM LISTING BY TOPICS

Phase I - AW Crewmember Orientation

Unit I - Fundamentals of ASW

Introduction to Aviation ASW Operator School, Aviation Anti-Submarine Warfare Operator, Aircrew Flight Equipment, First Class Swim, Flight Physical, Security of Classified matter, ASW Threat and Counter Threat, Aviation Physiology, Survey of ASW Detection Systems, ASW Aircrew Organization, ASW Aircraft Operations, ASGAC/ASTAC/OPCON, ASW Ordnance and Pyrotechnics, Brevity Codes and ASW Terms, Operational Publications, Unit Review and Examination.

Unit 2 - Principles of Signal Flow

Student Duty Preference, Mathematics for Electronics (P.I.), Powers of Ten (P.I.), Application of Powers of Ten (P.I.), Elements of Electrical Physics (P.I.), Conductors, Resistors and Insulators (P.I.), Ohm's Law (P.I.), D-C Series Circuits (P.I.), Work, Power and Energy (P.I., Multimeter, AW Electronic Safety, D-C Parallel Circuits (P.I.), D-C Combination Circuits (P.I.), Performance Test, D-C Review and Examination, Safety Wiring, Protective Devices, Introduction to Electromagnetism (P.I.), Generators (P.I.), A-C Signal Concepts, Inductance (P.I.), Transformers (P.I.), Capacitance (P.I.), Introduction to Vacuum Tubes (P.I., Introduction to Semi-Conductors (P.I.), Electromagnetic Spectrum (P.I.), Introduction to Oscilloscopes, Introduction to Radio, Introduction to Transmitters, Receiver Signal Flow Degradation, Unit Review and Examination.

Unit 3 - Introduction to ASW Equipment

Introduction to Sonobuoys, Passive Sonobuoys, Active Sonobuoys, Introduction to Sonobuoy Receiver Systems, Configuration of Sonobuoy Receiver Systems, Introduction to Jezebel, Theory of Jezebel Operations, Jezebel Applications, Introduction to Dipping Sonar, Theory of Dipping Sonar Operations, Dipping Sonar Applications, Introduction to a Radar System, Principles of Radar Operation, Radar Applications, Principles of IFF/SIF, Progress Test and Review, LLLTV Principles of Operation, LLLTV Applications, Infrared Sensors Principles of Operation and Application, Introduction to MAD, Theory of MAD operations, MAD Applications, Introduction to Tape Recorders/Reproducers, Tape Recorders/Reproducers, Introduction to a Data Display Systems, Data Display Inputs and Application, ASW Equipment Utilization, Introduction to ESM, ESM Application, Phase Review and Examination.

TABLE 1. "A" SCHOOL CURRICULUM LISTING BY TOPICS (continued)

Phase II - Fundamental Sensor Operation and Techniques

Unit I - Oceanography

Introduction to Oceanography, Logarithms and Decibels, Geological Oceanography, Physical and Chemical Properties of Sea Water, Air Ocean Interface, Biological Oceanography, General Theory of Underwater Sound, the Sonar Equation, ASWEPS/ASRAPS/SHARPS, Tactical Application of Oceanography to ASW, Review and Unit Examination.

Unit 2 - Non-Acoustics

Introduction to Active Acoustic Sensors, Target Analysis, Controls and Functions of a Sonar Detecting Set, Sonar Plotting, Aural Interpretation (Doppler Drill-Tapes), Analysis of Active Target Intelligence, Review and Performance Test, Introduction to Aural Interpretation, Introduction to Noise Sources and Turncounting, Introduction to Cargo Turncounting and Classification, Introduction to Warship Turncounting and Classification, Cargo and Warship, Audio Cue Review, Turncounting and Classification (Practice), Introduction to Submarine Turncounting and Classification, Cargo, Warship, Submarine Turncounting and Classification, Audio Cue Review, Turncounting and Classification (Practice), Introduction to Lightcraft Turncounting and Classification, Introduction to Non-Target Sounds (Biologics) Turncounting and Classification (Practice), Introduction of Non-Target Sounds (Noisemakers), Turncounting and Classification (Practice), Introduction to Non-Target Sounds (Torpedoes), Turncounting and Classification (Practice), Aural Classification Review and Unit Examination.

Unit 4 - Passive Acoustics

Acoustic Analysis Systems, the Lofargram, Grouping Harmonics, Propellers, Blades and Shafts, Prime Movers, Drive Systems, Auxiliaries and Artifacts, Progress Test, Introduction to Classification, Target Classification Methods, Diesel Submarines, Nuclear Submarines, Naval Surface Ships, Commercial Ships, Target Source, Gram Reading, Review, Performance Test and Unit Examination, Phase II Review and Examination.

Unit 5 - Comprehensive Examination

Comprehensive Performance Test (Non-Acoustic), Comprehensive Performance Test (Passive Acoustic), Course Review, Comprehensive Examination and Graduation.

TABLE 2. SH-2F PILOT CLASS SIZE AND FREQUENCY

CLASS	NEW CLASS START FREQUENCY	STUDENTS PER CLASS		CLASS DURATION (WEEKS)	
		Expected	Actual	Expected	Actual
West Coast	10 classes per year	6	10	16	24-32
East Coast	6 classes per year	10	6	16	24

Instructors. Instructor availability and loading at HSL-31 for pilot and AW instruction is given in Table 3 below. Although the number of instructors reported by the training command is higher than the table figures, it should be noted that the table reports the number of instructors actually available for instruction purposes, whereas the number of instructors given by training command reports includes instructors not actually available for instructional duties. The table reports usable instructor time.

In addition to teaching duties, all instructors are required to fill other squadron obligations also. Each receives an assignment to carry out during non-instruction hours. Such assignments might include being schedules officer, training officer, division officer, anti-submarine warfare officer, or some other duty.

Since all classes are delivered in lecture mode, all instruction hours require the instructor's presence 100 percent of the time.

Secretarial support for these instructors consists of a shared group of three clerk/typists who meet minimum qualifications. The time of these typists is shared with administrative personnel in their duties.

Instructor Training. The number of training flights given instructors is shown in Table 4, broken down by instructor type. Both West and East Coast pilot instructors receive no formal instruction. West Coast pilot instructors receive six briefing flights for which there is a short syllabus. AW instructors receive the entire AW curriculum before being allowed to instruct on the West Coast.

Instruction for West Coast pilot instructors takes the form of briefings delivered in the course of six to eight training flights. The information delivered during these flights consists of a study profile, an outline of what would be pointed out to students, standardization of flight procedures to be given students, and instruction on how to initiate inflight emergencies for student performance tests.

Projected and Actual Hours of Instruction. Table 5 below indicates (1) that the number of hours of instruction for pilot students varies by category of student and (2) that all sensor operator students spend the same amount of time in class. This table presents not only the designated hours of instruction (left-hand column) but the hours of instruction delivered the average student in 1974 (right-hand column). It can be seen that for both ground and flight instruction for pilot and sensor students, the designated hours of instruction are received by all students.

TABLE 3. HSL-31 INSTRUCTORS

INSTRUCTOR TYPE	INSTRUCTOR RANK	NUMBER AVAILABLE		HOURS OF TEACHING PER MONTH	
		WEST COAST	EAST COAST	WEST COAST	EAST COAST
Pilot	Comm Officer	15-17	23	Flight = 15 Ground = 4 Total = 19	Not available
Sensor Operator	NCO	3-4	6	15-18	Not Available

TABLE 4. HSL-31 INSTRUCTOR TRAINING

INSTRUCTOR QUALIFIED AS	CLASS OF INSTRUCTION RECEIVED	NUMBER OF FLIGHTS TAKEN	MODE OF INSTRUCTION
West Coast			
Basic Flight Instructor Pilot	0	6	Brief
All Phases Instructor Pilot	0	2	Brief
Sensor Operator Instructor	Full Sensor Operator Course	1	Class
East Coast			
Basic Flight Instructor Pilot	0	0	---
All Phases Instructor Pilot	0	0	---
Sensor Operator Instructor	0	0	---

TABLE 5. HOURS OF INSTRUCTION

Pilot

Designated		Actual		
			West Coast	East Coast
Ground Instruction		Ground Instruction		
CAT I	338.5	CAT I	338.5	338.5
CAT II	212.5	CAT II	0	212.5
CAT III	114.5	CAT III	0	0
CAT IV	212.5	CAT IV	212.5	0
CAT V	338.5	CAT V	338.5	0
Flight Instruction		Flight Instruction		
CAT I	50	CAT I	52.1	Not available
CAT II	34	CAT II	0	
CAT III	20	CAT III	0	
CAT IV	32.5	CAT IV	39.9	
CAT V	Unknown	CAT V	44.6	

Sensor

Designated		Actual		
			West Coast	East Coast
Ground Instruction		Ground Instruction		
393 (West)	180 (East		393*	180
Flight Instruction		Flight Instruction		
50			50	50

*NOTE: West Coast sensor operator instruction includes the 213 hours of search and rescue (SAR) instruction in its total of 393 hours. All sensor operators receive the SAR course automatically.

Levels of Pilot Training. SH-2F pilots arrive at fully qualified and experienced training status through a series of stages. At the end of the first stage, Basic Helicopter Training, pilots are certified as Naval Aviators and as Helicopter Qualified Pilots. This is a prerequisite to entering SH-2F training. The second stage is the Fleet Readiness Squadron, and pilots are certified at the end of training as NATOPS Qualified SH-2F Pilots (PQM). The third stage of pilot training takes place in the Fleet Squadron and qualified the pilot to one of three levels: Helicopter Second Pilot/Airborne Tactical Officer (H2P/ATO) or Helicopter Aircraft Commander (HAC).

The mission of SH-2F training involves production of pilots qualified in the SH-2F model (PQM).

Pilot Training Sequence. Table 6 below details the main blocks of instruction currently received by pilot students.

The sequence of instruction is not mandatory on the West Coast in any case except that flight instruction must be preceded by ground instruction. On the East Coast, the sequence is mandatory and carefully regulated.

Sensor Operator Training Sequence. West Coast sensor operator training consists of a series of independent topic modules. A list of them is provided in Table 7. Within the list of modules, only three must be taken in any prerequisite sequence: ground school, rescue flights, and ASW flights.

East Coast sensor operator training consists of HSL-30 Training Department instructions for all but four weeks of the student's career.

THE ISD PROBLEM. At the time the SH-2F ISD project was being conceived, a number of serious questions about ISD were in the minds of those concerned with Naval Air training.

At the most general level, the problem was whether or not the Navy should continue to go with ISD as the required approach to training. The ISD concept had been around for some time. All of the uniformed services, as well as many large educational and business organizations, had regulations which said that ISD was the preferred or required approach to instructional design and development. The general feeling was that ISD provided a framework that should lead to the development of instructional programs that are effective and efficient in developing job skills. In spite of this, it was very hard to present convincing evidence that ISD is workable, effective, or efficient in terms of resource consumption. There were two reasons for this lack of certainty.

TABLE 6. PILOT TRAINING SEQUENCE

West Coast

TOPIC	TAUGHT BY	DURATION
Aircraft Familiarization	NAMTD	5 days
LAMPS Indoctrination Course	FASO DET LAMPS	3 weeks
Nuclear Weapons	FASO North Island	3-5 days
Fire Fighting		3 days
Survival, Evasion, Resistance, and Escape School	FASO North Island	5 days
HSL-31 Ground Instruction	HSL-31	12 weeks
HSL-31 Flight Instruction	HSL-31	---

East Coast

TOPIC	TAUGHT BY	DURATION
FAM-Basic Flight	HSL-30 Training Department	9½ weeks
Tactics and Instrument Flight	FASOTRAGRULANT	3 weeks
Aircraft Systems	NAMTD	10 hours
Utility, Formation, and Evaluation	HSL-30 Training Department	6½ weeks

TABLE 7. SENSOR OPERATOR TRAINING SEQUENCE

West Coast

TOPIC	TAUGHT BY	DURATION
Non-sequenced:		
Swim School	HSL-31	4 weeks (soon to be cut to 1 week)
Plane Captain Course	HSL-31	2 weeks
	FASO Imperial Beach	11 days
Survival, Evasion, Resistance, and Escape School	FASO North Island	1 week
	SUBTOTAL	9 weeks (approx.)
Sequenced:		
Ground School	HSL-31	1 week
Rescue Flights	HSL-31	3 weeks
ASW Flights	HSL-31	4 weeks
	SUBTOTAL	8 weeks

East Coast

Ground School	HSL-30 Training Department	13 weeks
Aircraft Systems	NAMTD	1 week
Tactics	FASOTRAGRULANT	3 weeks

First, almost all versions of ISD were seriously lacking in detailed, prescriptive guidance for conducting the carious analysis and design phases which ISD requires. This was particularly true in the areas of content analysis (deriving sets of related objectives),method/media selection, sequencing, instructional strategy determination, lesson specification, and quality control planning. In other words, ISD approaches tended to describe broad steps or phases, but did not incorporate the detailed models, algorithms, and techniques from instructional science and technology which would make the approach really work in a standardized way in a typical training environment. Where ISD had been applied by instructional scientists, some subsets of these required techniques had usually been employed, but this often occurred in isolation; techniques and results were generally not documented, and therefore these cases did not lead to any total ISD model being made usable in standard fashion by a normally staffed training establishment. Under such conditions, it was impossible to establish a track record for ISD because full scope ISD had never been consistently attempted.

Second, many ISD applications did not make adequate provisions for necessary resources: personnel, time, facilities, or money. Frequently, instructional developers were enjoined to apply ISD to their projects, but were not given proper training or the right types and sufficient numbers of people, yet were constrained to produce finished courses within such tight deadlines that even minimal analytic effort was virtually out of the question.

Given these two limiting factors, it is no wonder that some casual observers were ready to conclude that ISD was a good idea that didn't work. The more thoughtful approach, however, was to undertake a systematic study of an ISD project which was relatively free of the limitations described above. It was within this very broad context that the basis problem was perceived.

Given that the Navy was entitled to a thoroughgoing, representative study of ISD, a second-level problem emerged: Could a prescriptive, standard ISD model be developed and documented? The terms "prescriptive" and "standard" are critical parts of this problem statement. No ISD model can be accepted as successful if it does not meet both criteria. A prescriptive ISD model is one which provides the full range of procedures, algorithms, and techniques discussed previously rather than just a very general five-or-six-step framework which doesn't show the developer how instruction should be developed. If an ISD model is prescriptive, then it can be used in a standard way across different training establishments within an organization. If ISD was to survive in the Navy, or anywhere else, evidence that ISD could meet these criteria had to be presented.

The third-level problem was to determine whether a relatively unconstrained, standard, full-scope ISD model actually

worked in terms of feasibility of application and ability to produce good, cost-effective instruction. This was essentially an empirical question. What was required, was the generation of ISD performance data within the context of a real instructional design project. The SH-2F was judged to be such a context.

Some of the specific feasibility questions that needed to be answered were: What kinds of people does ISD require and how much of their time is required to produce task listings, course organization and sequencing decisions, and lesson specifications; how much does all of this cost; what problems arise in necessary interactions with Fleet communities during instructional design; what are the interrelationships between perceived needs for training equipment, their relative costs and effectiveness?

To recapitulate, the basic question concerned the desirability of applying ISD routinely to all programs within Naval Air Training. To answer the question, it became necessary to apply a robust, full-scope ISD model, with adequate resource support, to a realistic air training problem and to measure the resulting effectiveness, cost and feasibility of the application. The SH-2F was one of four programs selected for an ISD effort in this attempt to establish the vital statistics on ISD.

PROJECT GOALS

GENERAL. Since the project involved both research and applied training development thrusts, it was judged prudent at the outset to delineate project goals in some detail to ensure that there would be no working at cross-purposes. In general, research interests were perceived as directed toward the acquisition of data reflecting on the ISD process--its methodology, its effectiveness, its efficiency, and its resource demands. On the other hand, applied training development interests were perceived as focusing on the timely production of a high quality training program for the SH-2F. At this level of generality, there was no immediately apparent conflict between these interests.

APPLIED TRAINING DEVELOPMENT GOALS. Viewed from the standpoint of the Fleet Readiness Squadron, the project needed to develop a training program which satisfied the following objectives:

> Provide standard aircrew training that is uniform in content with the minimum performance levels clearly stated, thereby creating completely objective-based grading criteria.

Provide a training program within the time schedule established by higher authority which maximizes the use of existing or contracted for training devices, assigns instructor assets and available classroom space, and considers the students' abilities and entry level skills.

Provide a viable, ongoing revision program that responds in a timely manner to fleet or student needs with cost, effectiveness, and turnaround time the prime considerations of the updating program.

Provide suitable instructor orientation and training to ensure smooth implementation of the training effort.

Make provisions for student control, scheduling, monitoring, testing, and tracking. Implied in this objective is the requirement to provide testing that is objective-based, criterion-referenced, and is diagnostic in nature.

These goals were exclusively related to the training orducts and materials to be developed on the project. However, it was clear that total accomplishment of these goals could not be realized as a result of the Phase I effort because of its inherent limitations in scope. Clearly, a usable training program would have to await completion of a later, Phase II effort.

RESEARCH-ORIENTED GOALS. There were four specific goals identified with the research orientation of the project. They were:

To develop a full-scope ISD methodology which specified techniques and procedures which can be used in each step of the instructional development procedure.

To validate the utility of these techniques.

To determine the personnel, time, and cost requirements to conduct an ISD effort.

To collect a set of data to support or refute the desirability of routinely employing ISD.

These goals clearly mapped on to the questions and concerns about ISD described earlier in this report. The fact that the SH-2F was just one of four similar projects enhanced the probability that useful, representative data would be forthcoming.

DISCUSSION: There appeared to be no inherently serious conflicts between the project goals related to research and those related to applied training development. Only two potential problem areas were identified. The first was a possible conflict over research orientation versus applied training devel-

opment orientation in the event that personnel or resources were committed to one to the detriment of the other. The second problem concerned the contractor's potential inability to fulfill research requirements or systematic training development requirements in the event that the pressing need for a usable training program caused the Fleet Readiness Squadron to divert its scheduled project support resources to other activities it might judge more beneficial.

ASSETS AND CONSTRAINTS

GENERAL: The training assets and program constraints bearing on the project at the time it began are described below. Assets represent resources within the existing SH-2F training system that were potentially applicable to the training program during later development or implementation or long-term evaluation and maintenance. Constraints represent firm outer limits on resources potentially available to the program. Both assets and constraints can be discussed in terms of people, time, facilities, equipment, and money.

Existing and Planned Training Facilities at HSL-31. It was expected that the squadron would occupy four classrooms. One of these woule be devoted s rictly to pilot training, and the other three would be reserved for sensor operator training. Each classroom would have an estimated capacity of at least twelve students, one instructor, and media equipment. The percentage of time the rooms will be in use is not known.

Each room would be equipped with a blackboard, a projection screen (hanging, but mobile), and an equipment shelf for media storage. Media equipment on hand at HSL-31 for instruction includes a small but presently sufficient complement of slide, overhead, and film projectors and screens. Study areas other than the four classrooms were not available. There was no individualized learning center to which students could go for individualized instruction or review of classroom presentations. However, it was anticipated that a learning center could be provided. In the past, the pilot ready room has doubled as a social/study area; the climate there is not considered conducive to study.

HSL-30 Existing Training Facilities. Three classrooms are available at HSL-30, each having a capacity of 30 students. One each of the following media devices are available: slide projector, overhead projector, and movie projector.

Training Equipment. Equipment available for West Coast training purposes at NAMTD and FASO DET LAMPS at NALF, Imperial Beach, is listed below. NAMTD does no training presently for sensor operators. The main Composite Trainer consists of equipment workable in only passive mode for cockpit controls, ASE systems, transmission, power train, engine, rotors, hydraulics, electrical systems, rescue hoist, avionics, and sonobuoys.

The FASO DET LAMPS training equipment for sensor operators consists of equipment into which simple but not thoroughly realistic signals may be input to exhibit the working of the equipment and teach basic detection skills.

The 14H4 Tactical Trainer is a device for setting up tactical ASW problem situations for three pilot/copilot teams simultaneously. The level of realism is moderate. Pilots may activate controls to influence the progress of the simulazion.

Recently accepted at both East and West Coast FRS squadrons is a Weapons Systems Trainer capable of dusk scene only, full mozion simulation of SH-2F aircraft flight and operations for both pilot and sensor operator positions.

Instructional Materials Production Capabilities. A full range of instructional mazerials production facilities at NAS, North Island, made it possible to produce instructional media presentations of virtually every type. Little problem was encountered obtaining adequaze support for the SH-2F production effort.

CONSTRAINTS: The chief constraints that were apparent at project onset were:

Navy subject matter experts would be limited in number.

Project progress must proceed at a rate which would permit complete development of the training program by November 1976.

SECTION II

INSTRUCTIONAL SYSTEMS DEVELOPMENT

BACKGROUND

At the time the SH-2F project began in mid-1975, ISD had close to a ten-year history in the field of training technology. This field had been undergoing its own rapid expansion during the ten previous years, with a mixed record of successes and failures. During these years, education and training were under considerable pressure to develop more effective methodologies. With the 1950's came an increasing awareness that traditional methods were lagging behind real world requirements for teaching expanding bodies of knowledge to an expanding student body. On the civilian scene, the use of the popular catch phrases "population explosion" and "knowledge explosion" symbolized these requirements in a fairly accurate way. There developed a widespread perception of the educational system as inadequate. This was heightened further in later years when science studies were lionized during the early days of the space age and when the "Why Johnny Can't Read" controversy focused public attention on even more basic problems. On the military scene, the early 50's and 60's witnessed rapid build-ups in personnel strength, with inevitable pressures on training methods and capabilities.

It is important to understand that all of this was taking place in the context of a generally expanding technology. Responding to the pressures for change, the world of education and training seized what it could find and used it, sometimes with disastrous results. Although such "outside" technologies as audiovisual presentation, television, computers, and systems engineering eventually became fair game, the first and ultimately most significant technology to be harnessed in education and training was a more or less homegrown product: instructional objectives and programmed instruction (PI). Two of the most fundamental procedures in ISD came from these theory-based concepts. One was the idea of objectives or explicit behavioral outcomes of learning as the cornerstone of instructional design and development. The other was the idea of program evaluation and revision based on empirical tryout. These notions have survived relatively intact over twenty years or more.

What did not survive in nearly so robust a form was the attempt to cram virtually every kind of teaching into the "frame" format associated with programmed texts. Despite admonitions by its more systematic proponents that PI was really a process more than a product, the product orientation won out. Vast quantities of programmed materials were generated quite unsystematically. Much of this material turned out to be trivial or ineffective. Unfortunately, the great proliferation of teaching machines which came in the wake of the PI boom resulted only in a more efficient delivery of untested, inconsistent instruc-

tion of doubtful quality. Predictably, the bubble burst and PI was widely condemned--mostly for the wrong reasons.

This same pattern has repeated itself again and again with various technologies. "A/V" (audiovisual), "SRS" (student response system), "ETV" (educational television), "CAI" (computer-assisted instruction), and others have taken turns in the forefront of education and training technology. Each has been regarded as the final solution to the serious problems in the field. Each has crashed as a result of uncritical and unsystematic application.

It finally became apparent that, despite the existence of the corners one concepts--objectives and quality control--and despite the rich array of devices available, most instructional programs were being developed using as many theories of instruction as there were developers. In many cases, objectives were added to instruction as an afterthought, rather than driving lesson development as they were intended. In only a few cases were the prescribed empirical tryout and revision steps being carried out consistently, particularly in large scale training projects. As a result, most instructional programs could be characterized as having one or more of these problems:

Critical content is left out.

There is an overabundance of content which represents what the instructors like to talk about, but which may be irrelevant to program needs.

There is no clear definition of what is supposed to be learned.

Instructional methods and media are selected either by default, or by the hardware specifications that appear in promotional literature.

Testing is oriented to general content familiarity rather than to achievement of specified learning outcomes.

There is general lack of correspondence among the instructional program goals, the instructional materials, and the tests.

Instructional design and development efforts tend to be inefficient in terms of the kinds of personnel used and the roles in which they are used (e.g., instructional content experts are used as instructional process experts).

Little or no attention is given to assessing the effectiveness of the instructional program, or to providing a means for keeping it current.

ISD evolved in response to these symptoms and their underlying causes. It represented an attempt to systematize the procedures used in instructional design, development, and evaluation; to make the procedures explicit and orderly, and to provide some guidelines for carrying them out.

Systems engineering and human factors concepts make significant contributions. The development process was broken out into a series of manageable components which could be defined and related to other components in terms of inputs, outputs, and feedback. Procedures relating to front-end analysis of problems and tasks were introduced, thereby strengthening the relationship between instruction and real world performance and learning requirements.

By the late 60's the ISD concept was well known, although under a variety of terms such as "The Systems Approach," "Systems Approach to Training (SAT)," and "Systems Engineering of Training." It was in widespread use within government and industry. It purported to define a set of procedures for producing effective, efficient, relevant training programs, programs in which the objectives, the materials, and the tests were consistent with each other, and with post-training performance requirements.

It was claimed that cost savings accrued to ISD because the "lean" (need to know) courses resulting from ISD were developed more efficiently and could be significantly cut back in length as compared to their more conventionally designed versions.

Yet at the end of ten years' experience with ISD, serious questions could be raised about it. These concerns have been detailed in the Introduction to this report. Briefly there are two main problems. The first problem is reminiscent of those experienced in the 50's and 60's. The fact is that most ISD models are solid on the ends (front-end analysis and quality control) but soft in the middle (design, development, and implementation). Only very general guidance is provided in such areas as objectives development, selection of media, specification of instructional strategies, and others. The result is that much of the detailed work in course development is still intuitive and artistic and very much dependent on the developer's theory of instruction. What this means is that ISD has not yet achieved the level of a standard technology. This is why it is difficult to make general statements about the applicability or projected results of ISD with very much confidence.

The second problem concerns the logistical or resource support provided for large-scale ISD projects. Typically, ISD has not been provided with the time or personnel resources necessary to implement a sophisticated system. The result is that many

ISD applications have been seriously hampered, to the point where "system" had to give way to "make do." In a very real sense, ISD has not had a full-scale tryout for this reason. One main reason for poor resource support is a lack of information about what ISD costs. This was one of the questions that the SH-2F project was designed to solve.

ASSUMPTIONS

The following assumptions underlie the particular ISD model for this project:

Training programs should be established only when more direct solutions are unavailable. Human performance problems are frequently best solved by management action or work situation modification.

The content of an instructional program must be relevant to the performance requirements of the job, position or duty for which the course is preparing the students. The course should teach what is required on the job.

A good instructional program must be efficient in terms of accomplishing its goals with minimum consumption of instructional resources (time, money, people, facilities.)

The most effective instructional programs are those which are predicated on some form of explicit learning outcomes or objectives.

The selection of any instructional method, medium, or device should be based on the kind of learning situation involved. The "goodness" of such methods cannot be spoken of in the abstract, but in terms of some specific learning situation, or class of learning situations.

All instructional programs are something less than fully effective and fully efficient due to mistakes made by instructional designers, particularly during the early versions of the course. A good instructional design system must, therefore, provide for empirical testing of the instruction, followed by revision or modification in those areas of instruction that have been shown to be ineffective or irrelevant.

All ISD models have both process and content inputs. The most accurate and relevant <u>content</u> input source is the client who will be using the <u>final</u> product of the development process. The most competent <u>process</u> input sources are individuals who have had extensive training and experience in instructional science and technology.

METHODOLOGY

The ISD methodology employed by the Contractor in this project did provide the type of prescriptive guidelines necessary to support a standardized ISD model. It used the basic framework of the Army's "Systems Engineering" model (AR 350-100-1, 1968), supplemented by detailed algorithms that were designed and tested during almost two years of ISD experience with the Navy's S-3A aircrew training development project. An overview of the ISD methodology that was employed may be found in the document entitled, "A Systems Approach," which is Appendix A of this report. A very detailed account of the methodology will be found in the Implementation section of the report and in Appendix B. A brief summary appears below.

The general framework of the ISD model was a seven-step procedure, as shown in Figure 1.

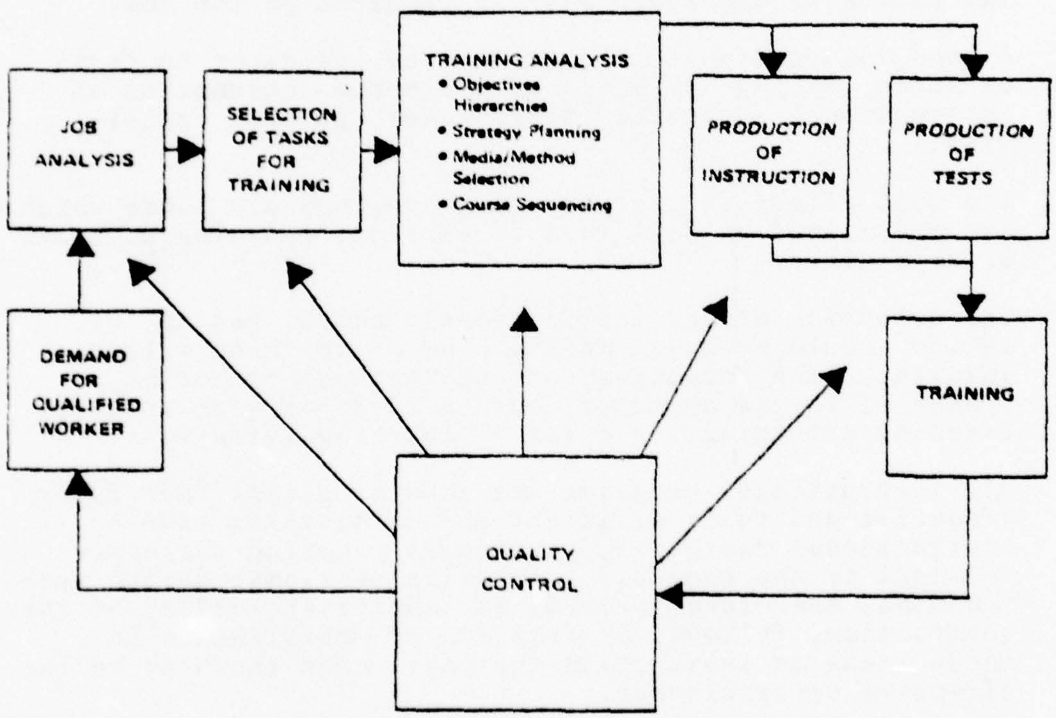

Figure 1. The General Framework of the ISD Model Used in the SH-2F Training Development Project

The first step in this ISD model is to perform a Job Analysis. This analysis outlines the goals and objectives that the final training program must meet. It also lists in detail those resources and constraints that exist in the present training environment, and those that will be in effect in the program being developed. Finally, it presents a complete listing of every task a qualified job holder must be able to perform.

The task listing forms the basis of the next step in ISD: the Job Analysis Survey. In the Job Analysis Survey, qualified job holders are questioned regarding where they learned, where they first performed, and how often they perform each of the tasks outlined in the task listing. The results of the Job Analysis Survey are used to determine which tasks will be trained in the course being developed.

Once the tasks have been selected for training, they are analyzed in greater detail through the development of objectives hierarchies. These hierarchies show all the component objectives for a major task, arranged from the simplest and most fundamental up to the most complicated and advanced. Behavioral objectives are used to specify the decisions a student must make, or actions he must be able to perform to successfully carry out each task. They also specify the conditions under which the tasks must be performed, and the minimum acceptable performance standard. These objectives are laid out in hierarchies to make clear the relationships existing between them.

Once the objectives have been developed, they are sequenced and grouped into units and lessons. This sequencing is determined on the basis of three rules. First, objectives must be sequenced such that objectives which are lower in a hierarchy (more basic learning) are taught prior to higher level objectives in the same hierarchy (more advanced learning). Second, the sequencing should allow for early hands-on experience with real tasks whenever possible. Finally, when sequencing independent "legs" of a hierarchy, the most critical or difficult leg should be presented first in order to provide the largest possible amount of practice time for difficult material.

Closely tied to course sequencing is media selection. The optimal presentation media for each objective are determined on the basis of the behavior involved (e.g., will the student be memorizing information or using it to solve problems?), the content involved, and the minimum instructional display and response detection requirements (e.g., will the instruction require words only, or pictures, or color or movement, or real objects?) These decisions are based initially on learning requirements only, but are then modified to conform to resources available, and to consolidate media within a lesson.

After media decisions have been made, production of Lesson Specification begins. A Lesson Specification outlines the instructional strategy and the critical content for each objective. It specified the number and types of examples, practice items, and test items.

The next step of the development process is the actual authoring of lesson and test material. To prepare this material, authors are given the Lesson Specification for a set of objectives. They are also given a lesson guide that explains how to produce instructional material for each of the media which are being used. The authors, who are qualified subject-matter experts, then produce a rough draft of the lesson. This draft is reviewed by an instructional design specialist and an independent subject-matter expert. It is then revised and produced in smooth form.

The final step in the development process is to conduct a tryout and formative evaluation of the material. Based on the data collected in the tryout phase, the material is revised and evaluated again. Where necessary, the objectives and hierarchy are revised to more accurately reflect the structure of the task being trained.

The scope of the second phase of the SH-2F development project was concerned with production and testing of instructional materials and design and testing of the management (implementation) plan for the use of the materials in an instructional "system."

A summary of these major ISD steps in terms of their inputs, outputs, and basic processes is shown in Table 8.

TABLE 8. INPUTS, OUTPUTS, AND PROCESSES INVOLVED IN THE MAJOR STEPS IN ISD

ISD STEP	PROCESS	INPUT	OUTPUT
1. JOB ANALYSIS	Analysis of training requirements, & project goals, assets & constraints.	Descriptive statements from qualified subject-matter experts & training program managers; training documents; observation of the training environment.	Job Analysis Document o Project goals o Assets & constraints o Task listings
TASK LISTING	Analysis of personnel functions & responsibilities to determine the major tasks performed.	Descriptive statements from qualified subject-matter experts.	Task Listing A list of major tasks performed within each area of responsibility, mission, & mission phase.
GOALS ANALYSIS	Analysis of the goals & objectives of the major participants in an ISD project.	Descriptive statements from qualified representatives of the participating organizations; pertinent documents.	A listing of project goals by participating organizations.
ASSETS & CONSTRAINTS ANALYSIS	Analysis of the projected training environment to determine the availability of training-related resources & training-related constraints.	Descriptive statements from training managers; pertinent documents; observation of the training environment.	An inventory of personnel, equipment, & facility assets by type & number; a listing of pertinent constraints & limitations.
JOB ANALYSIS SURVEY	Validating the task listing & securing additional data about each task for use in the next step.	Questionnaire entries by experienced job holders; their responses to questions about each task on the task list.	Supplementary information to the task list: frequency & criticality of task performance; when learned; when first performed.
2. SELECTION OF TASKS FOR TRAINING	Analysis of all tasks on the list to determine which must be trained for in the program.	Results of Job Analysis Survey; information about student's entry level from training managers.	Categorized task listing in which each task is identified: for training, not for training, for subsequent training, for familiarization or review only.

TABLE 8. INPUTS, OUTPUTS, AND PROCESSES INVOLVED IN THE MAJOR STEPS IN ISD (CONT)

ISD STEP	PROCESS	INPUT	OUTPUT
3. TRAINING ANALYSIS	Analysis of tasks to determine objectives. Analysis of objectives to determine media. Establishment of a sequenced syllabus with instructional strategy specifications for each lesson.	Categorized task listing from Step 2; content data from qualified subject-matter experts; assets & constraints data from Job Analysis Document. Also algorithms & formats for media selection, sequencing, objectives analysis & classification, & lesson specification.	Sequenced syllabus (course organization) with media identified for each lesson; an instructional strategy specification for each lesson; a list of required training equipment & devices.
OBJECTIVES ANALYSIS	Analysis of tasks to determine the hierarchical structure of component skill & knowledge objectives; classification of each objective into type of learning required.	Categorized Task Listing from Step 2; objectives analysis algorithm; content data from qualified subject-matter experts; objectives classification model.	Hierarchy of supporting objectives for each major task selected for training, including a designation of the type of learning required by each objective.
COURSE ORGANIZATION & SEQUENCING	Organizing objectives into meaningful, practical instructional units; sequencing the units to facilitate teaching & learning.	Objectives hierarchies; organization & sequencing model; class size & student throughput data from job analysis document; data from training manager.	Structured & sequenced course objectives graphically illustrated in a set of unit & lesson "maps".
MEDIA SELECTION	Analyzing objectives to determine the instructional methods & media that would be most effective to teach each one.	Hierarchies of classified objectives (output of Objectives Analysis); media selection algorithm; unit & lesson maps.	Alternative media choices for each chunk of instruction shown on the lesson maps.
LESSON SPECIFICATION	Determining the type & sequence of instructional components to be used for each chunk of instruction (instruction strategy design).	Lesson maps with media selected; instructional strategy expertise; lesson specification model.	A blueprint or prescription for developing each chunk of instruction, including critical content components, & proposed arrangement of examples, practice, feedback, & other vital components.

TABLE 8. INPUTS, OUTPUTS, AND PROCESSES INVOLVED IN THE MAJOR STEPS IN ISD (CONT)

ISD STEP	PROCESS	INPUT	OUTPUT
4. PRODUCTION OF INSTRUCTION	Developing usable instructional materials by providing the content inputs called for in the lesson specification.	Lesson specifications & maps (output of previous two steps); content data from qualified subject-matter experts.	Fully developed, ready to use instructional materials.
5. PRODUCTION OF TESTS	Developing tests by providing the content inputs called for in the lesson specification.	Lesson specifications & maps (output of previous two steps); content data from qualified subject-matter experts.	A complete set of knowledge & performance tests, ready to use with the instructional materials.
6. TRAINING	Conducting actual training of real students according to the predetermined training schedule, using newly developed materials.	Instructional materials & tests developed in Steps 4 and 5.	Individuals trained to the levels specified in program goals; data for use in quality control activities.
7. QUALITY CONTROL	Planning for and implementing ongoing course revisions & updates based on a variety of data which reflect on the effectiveness & efficiency of the instructional program.	Test data, student attitude data, instructor & training manager observation, post-training surveys of course graduates & their supervisors.	Revisions of the instructional materials & of the training system which result in more effective, more efficient, more palatable, more technically accurate training.

One required ISD step was missing from this model at the outset of the project. It had been previously recognized that adequate logistical support in ISD required interaction between the ISD process and the logistical support system. In particular, it became apparent that this logistical system had to have input to the media selection process in order to avoid specifying media requirements in excess of available resources. It also was apparent that once acceptable media selections were made, this information had to be fed to the logistical support system in order to allow sufficient planning and procurement time.

This interaction step was planned into the SH-2F project. This meant that part of the project work would involve developing and testing a systematic procedure for carrying out this vital step.

SECTION III

IMPLEMENTATION

OVERALL PROJECT ORGANIZATION, STAFFING, AND PHASING

No formal project-level organizational structure existed for the SH-2F project; therefore, management of the project took place through a cooperative effort in which all of the involved organizations took part.

ORGANIZATION AND PERSONNEL. The roles of the organizations participating in the SH-2F project were:

NAVTRAEQUIPCEN--Project coordination, direction, and direct on-site monitoring through periodic visits.

NPRDC--Continual on-site monitoring of project progress for NAVTRAEQUIPCEN and procurement of needed support materials for production and reproduction.

Contractor--On-site training, guidelines, and review with respect to ISD process and techniques.

HSL-31--Provision of subject matter expertise and on-site project facilities, including work areas and Learning Center space.

HSL-30--Provision of review for evolving course structures and provision of space for Learning Center.

Contractor and Navy Squadron staffing assumed various configurations during the life of the project as required by the work being done at any given time. The contractor staff grew as the production flow began and as its volume increased. The Navy ISD Team organization changed configuration as the responsibilities of the team moved from authoring and production of instructional materials to implementation and management of the instructional system. Figure 2 diagrams the organization of the contractor staff during authoring, production, and implementation. Heavily lined boxes indicate the staffing for (1) the early stages of authoring and (2) the implementation period following production. All other boxes indicate staffing patterns and organization during the production of instructional materials. Table 9 contains the titles and function of each staff member of the contractor staff.

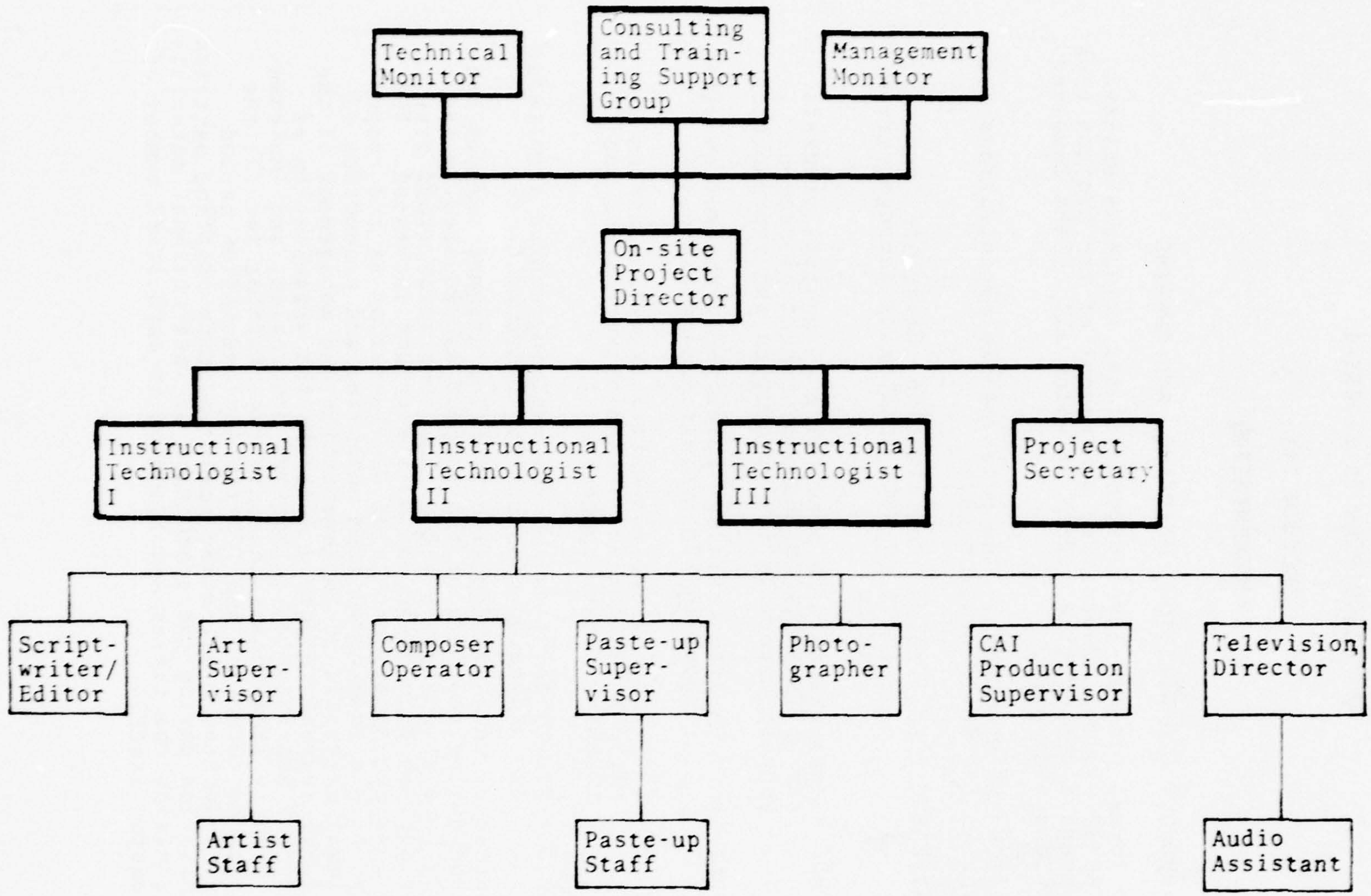

Figure 2. Contractor Staff Organization - Heavy lines denote staffing during early stages of authoring and during implementation. All other lines denote staffing during production of instructional materials.

TABLE 9. TITLE AND FUNCTION OF CONTRACTOR STAFF PERSONNEL

TITLE	FUNCTION
On-site Project Director	Specification of basic ISD methodology; SME training; materials review; primary input into evaluation planning and implementation planning.
Instructional Technologist (I)	Catalogue and control flow of Lesson Specifications to authors; maintain progress records on authoring; conduct first-line review of instructional materials; conduct day-to-day training of SMEs and update of training; pass authored instruction to IT (II).
Instructional Technologist (II)	Receive authored instruction from IT (I); distribute material from authored segments to appropriate production personnel; control flow of materials through production for regulating schedules, assignments, staff levels; conduct first-line quality control of produced materials.
Instructional Technologist (III)	Review/edit authored materials in depth and specify revisions as per project policy and guidelines from project director.
Scriptwriter/Editor, Art Supervisor and Art Staff, Composer Operator, Paste-up Staff, Photographer, Television Director, Audio Assistant	Produce rough versions and final version instructional materials as per instruction and project guidelines in the following media: workbook, tape/slide, random access slide, and videotape.
Computer-assisted Instruction (CAI) Production Supervisor	Provide packaging, data entry, and debug skills at CAI site, monitor instructional materials for adequacy for CAI production.

Since the ISD Team underwent major configuration changes between the production and implementation activities, those configurations are diagrammed separately. Figure 3 diagrams the West Coast ISD Team organization during Authoring and Production. Table 10 presents the titles and functions of members of that staff. Figure 4 diagrams West Coast ISD Team organizations during implementation, and Table 11 presents the titles and function of that staff. The implementation of the instructional system on the East Coast through HSL-30 required the establishment of an ISD organization. That organization is diagrammed in Figure 5, and the functions for each title are provided in Table 12.

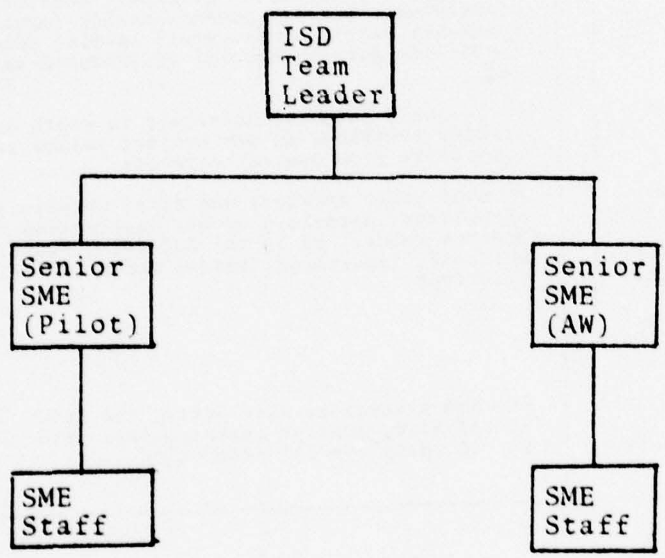

Figure 3. West Coast ISD Team Organizations for Authoring

TABLE 10. TITLES AND FUNCTIONS FOR WEST COAST ISD TEAM PERSONNEL DURING AUTHORING AND PRODUCTION

TITLE	FUNCTION
ISD Team Leader	Coordinate ISD Team activities with squadron and contractor; schedule and direct SME work; provide final-echelon technical review of SME work.
Senior SME	Provide intermediate-echelon technical review of SME work.
SME	Write Lesson Specification Documents; author instruction; revise instruction according to revision specification; coordinate with production staff to assure technically correct pictorial materials.

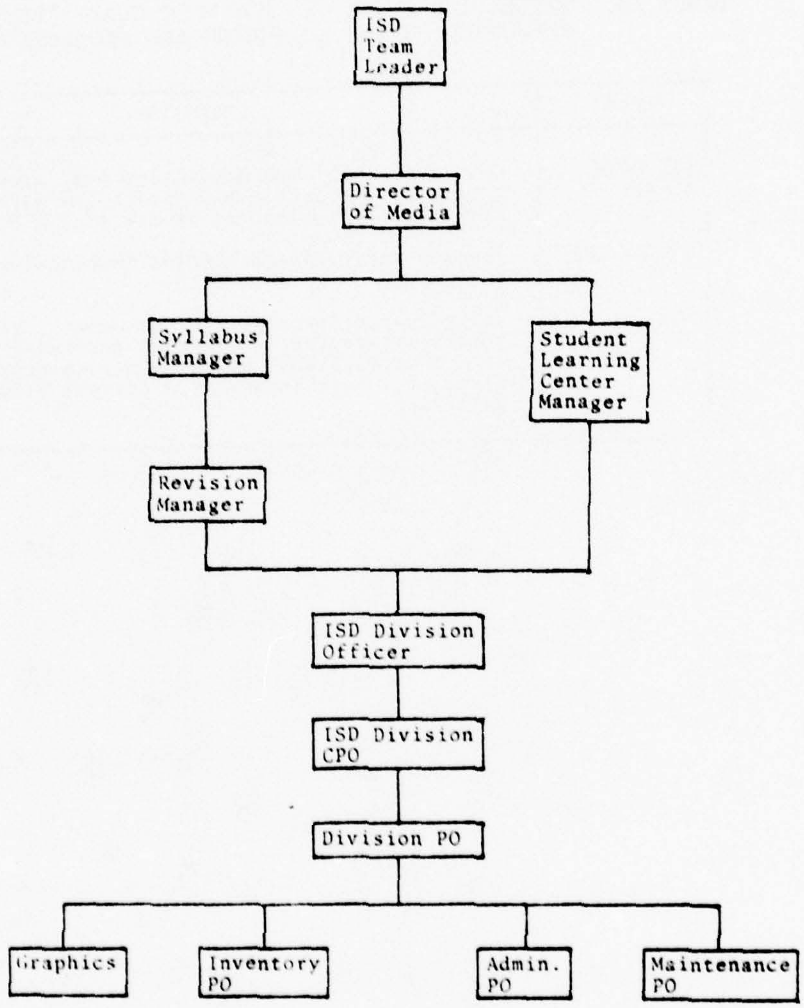

Figure 4. West Coast ISD Team Organization During Implementation

TABLE 11. WEST COAST ISD TEAM TITLES AND FUNCTIONS DURING IMPLEMENTATION

TITLE	FUNCTION
ISD Team Leader	Oversee West Coast Student Learning Center Operation; represent SH-2F system to wing level command; interface with East Coast System
Director of Media	Determine needed revisions; supervise revision authoring and production.
Syllabus Manager	Control pilot syllabus contents.
Revision Manager	Author needed revisions to instructional materials.
Student Learning Center Manager	Run Student Learning Center; schedule ISD personnel to staff center.
ISD Division Officer	Coordinate activities of ISD Team Staff through ISD Division CPO.
ISD Division CPO	Coordinate activities of ISD Team Staff for running of instructional system and maintaining it in current working order.
Division PO	Operate library; keep records on students in system.
Graphics	Produce graphics for revised and new instructions.
Inventory PO	Control materials inventory; insure adequate stocks on hand of materials.
Administrative PO	Type and compose changes to printed instructional materials.
Maintenance PO	Maintain media devices in working order.

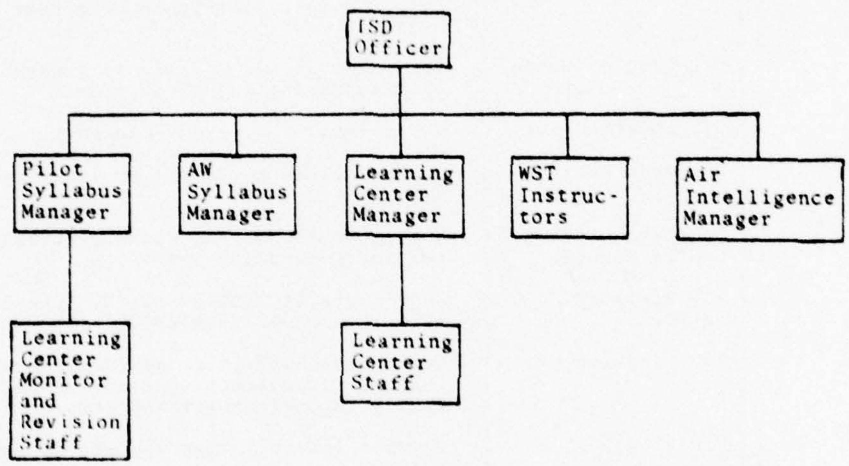

Figure 5. East Coast ISD Organization During Implementation

TABLE 12. TITLES AND FUNCTIONS OF EAST COAST ISD ORGANIZATION PERSONNEL DURING IMPLEMENTATION

TITLE	FUNCTION
ISD Officer	Represent East Coast system to local commands and to West Coast ISD Team; supervise operation of East Coast system.
Pilot Syllabus Manager	Control contents of pilot syllabus; suggest changes as needed; execute changes when approved.
AW Syllabus Manager	Control contents of AW syllabus; suggest changes as needed; execute changes when approved.
Learning Center Monitor and Revision Staff	Act as monitor at Learning Center; author revisions when assigned.
Learning Center Manager	Supervise day-to-day operation of Learning Center.
Learning Center Staff	Execute directives of Learning Center manager in operations of Learning Center.
WST Instructors	Monitor students during WST exercises.
Air Intelligence Manager	Update and maintain Air Intelligence portions of the instructional materials.

The titles and functions of NAVTRAEQUIPCEN and NPRDC personnel associated with the project are reported in Table 13 below.

TABLE 13. PROJECT PERSONNEL AND FUNCTIONS FOR NAVTRAEQUIPCEN AND NPRDC

TITLE	FUNCTION
NAVTRAEQUIPCEN--Scientific Officer and SH-2F Project Manager	Overall project coordination; interface between SH-2F and other SAT projects; technical monitoring of the project.
NPRDC--On-site Project Monitor	Coordinate reporting of progress to NAVTRAEQUIPCEN; aid in procuring support for production both in facility arrangements and in supplies for production and reproduction. AW SME -- Act as member of Sensor Operator SME Team during authoring, review, production and tryout.

PROJECT PHASING. The phasing of major ISD activities was planned at the outset of the project as shown in Figure 6. The schedule covered 21 months of effort. At the time this report is issued by the contractor in final form, sixteen of those months will have elapsed.

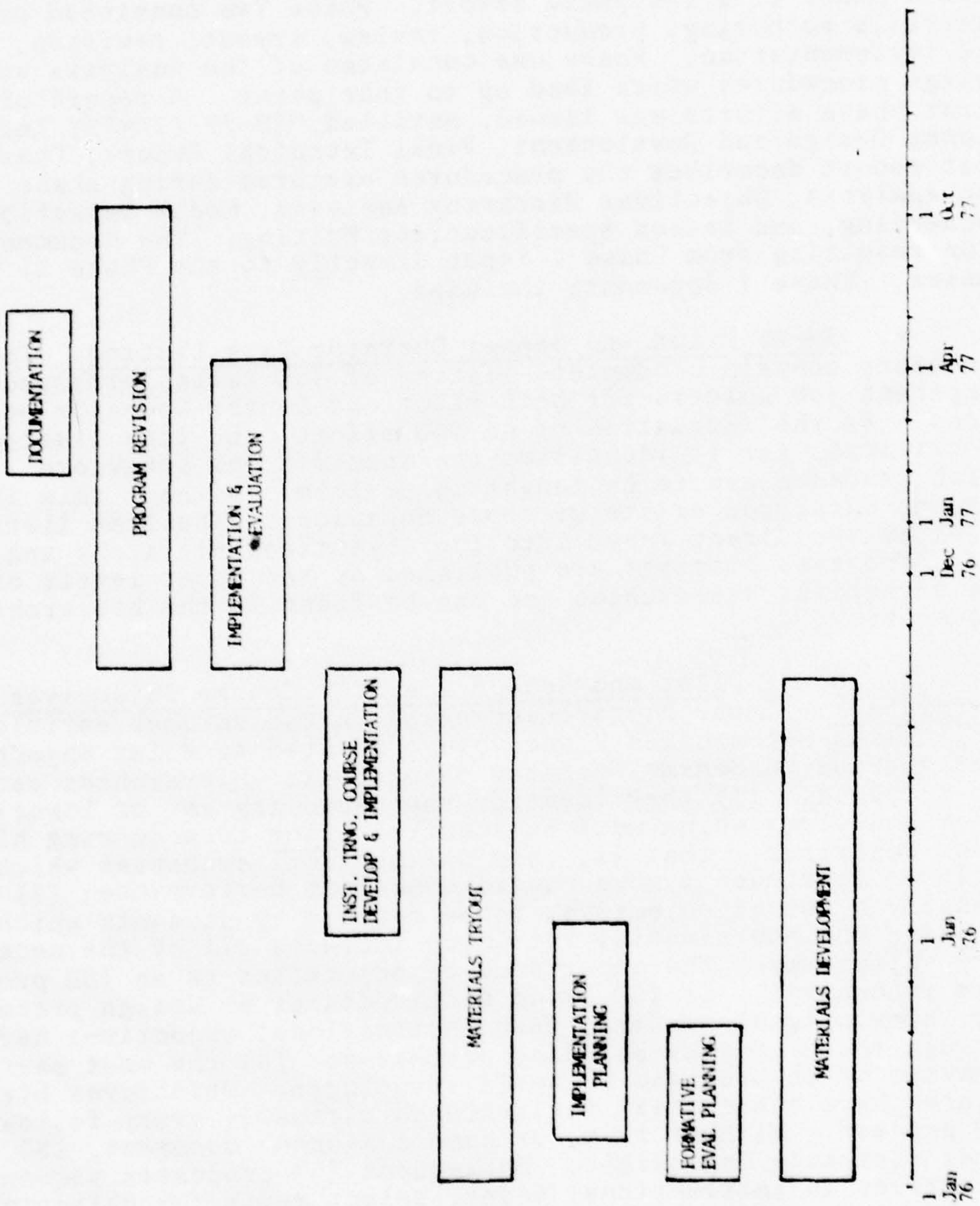

Figure 6. SH-2F Project Phasing

STEP-BY-STEP PROJECT ACTIVITIES

PROLOGUE. The present materials development project was the second phase of a two-phase effort. Phase Two consisted of materials authoring, production, review, tryout, revision, and implementation. Phase One consisted of the Analysis and Design procedures which lead up to that point. A report of the first phase efforts was issued, entitled "SH-2F (LAMPS) Instructional Design and Development, Final Technical Report, Phase 1." That report describes the procedures executed during Phase I: Job Analysis, Objectives Hierarchy Analysis, Media Selection, Sequencing, and Lesson Specifications Writing. The documentation resulting from Phase I input directly to the Phase II processes. Phase I documents included:

a. SH-2F Pilot and Sensor Operator Task Listing. These documents contain a complete listing of job tasks performed by competent job holders for both Pilot and Sensor Operator positions. As the foundation of an ISD effort, the task listing is critical, for it identifies the specific job behaviors which students are to be taught to perform. Without this listing, no catalogue exists of those behaviors. The task listing provides the direct input into the objectives hierarchy analysis. The task listings are published as the upper levels of the objectives hierarchies and can be found in the hierarchies documents.

b. SH-2F Pilot and Sensor Operator Course Objectives Hierarchies. These hierarchies exist in two volumes entitled "Objectives Hierarchies." one volume devoted to Pilot objectives and one to Sensor Operator objectives. Hierarchies serve two purposes: (1) they identify the necessary set of lower-order behaviors which must be acquired prior to acquiring higher order behaviors: that is, they define local sequences which are followed as students move toward competent performance; (2) they identify a set of objectives to be reached by students which excludes the nonessential yet which includes all of the necessary objectives. The importance of objectives to an ISD program is central. If ISD is an architectural or design process for instructional systems, then instructional objectives derived through the hierarchy-building process are for the most part the elements which are used to build structures. Objectives hierarchies have substantial influence on virtually every following ISD process. Without them, or some analogous document, ISD becomes virtually impossible. Subsequent ISD processes sequence objectives in instructional order, select media for objectives, specify instructional strategy for one objective, etc. Hierarchies are the basic building blocks of courses of instruction. For the SH-2F training, instruction and evaluation was developed for 678 instructional objectives.

c. SH-2F Pilot and Sensor Operator Course Media Selection and Sequence. These items, published in a three-volume document entitled "Selection of Instructional Methods and Media," prescribe the order in which instructional objectives are presented to students and the order and contents of major performance exercises. Sometimes called a course syllabus, this document describes the architectural design of a course of instruction.

d. SH-2F Lesson Specification Documents (LSDs). These consist of an unpublished set of specifications, one for each instructional objective, for the instructional strategies, practice exercises and tests to be created. They may be considered the "recipe" by which instructional segments are authored. These arise directly from the instructional methods and media document but relate through it to the objectives hierarchies. They draw upon the existing bodies of research and practice for their substance.

All of the above products were available for Phase II and formed the starting point from which materials authoring proceeded. They constitute the major input to Phase II. representing careful analysis of instructional needs and design of syllabi and material to meet them.

INTRODUCTION. At this point the report begins a detailed description of the activities conducted during Phase II of the project. Some preliminary remarks will orient the reader to the sections which follow.

The project phasing chart in Figure 6 already referred to is somewhat misleading as a summary of the activities which took place during the SH-2F project. The major boxes on that chart appear to represent independent activities taking place in parallel when in fact, they represent activities which are closely interdependent upon each other and integrative with each other. The authoring, production, and quality control process for a single segment (one objective's worth) of instruction should be represented as a series of steps taking place in both the Development/Production and Tryout/Quality Control phases. Figure 7 represents the steps in the development and quality control of one segment against the backdrop of the phasing chart. Each segment produced passes through the steps shown in the prescribed order.

The conclusion to be reached is that subsequent subsections of this report may appear to be disjointed because activities are reported by phase, rather than in the context of the concurrent interplay of two phases. Order can be brought to the descriptions which follow if the sequence described in Figure 7 is kept in mind and consulted often.

The organization of the remaining subsections will include the following types of information for each step described:

A narrative description of events, activities, and accomplishments.

A detailed account of problems and solutions.

A description of SME training activities conducted.

An account of calendar and personnel time consumed.

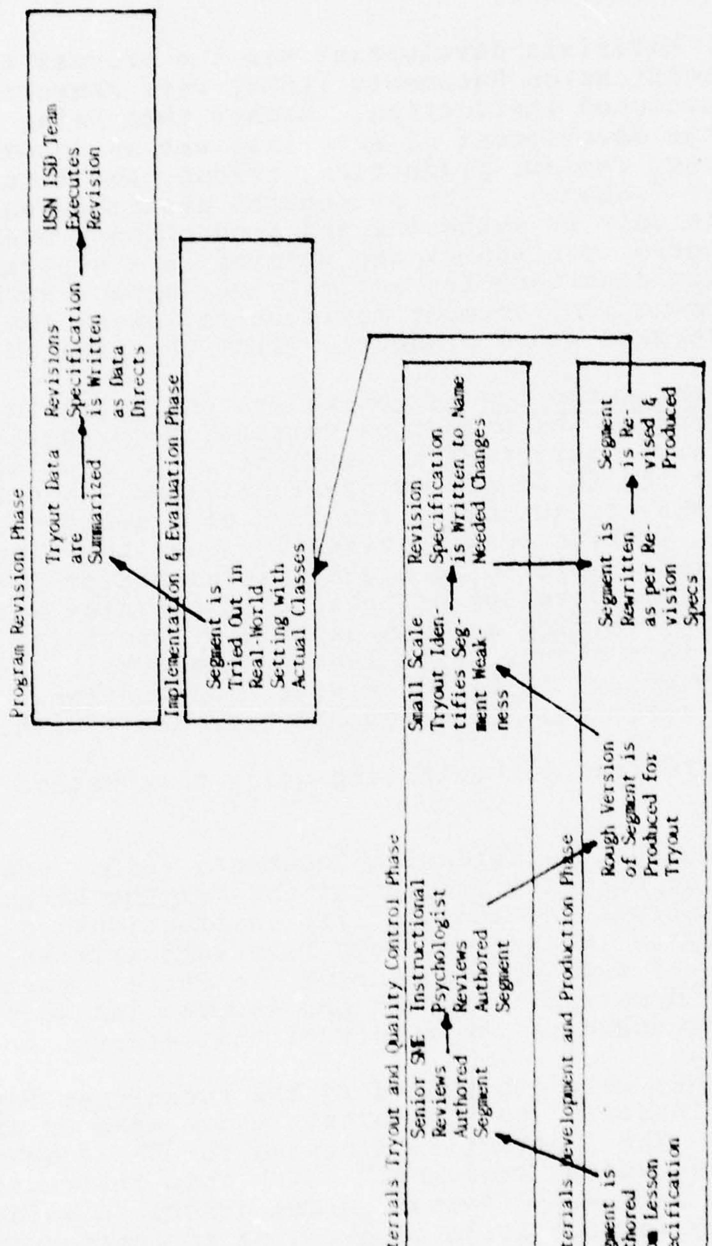

Figure 7. Steps in Instructional Segment Production Compared with the Project Phasing Chart (See Figure 6. for comparison)

MATERIALS DEVELOPMENT.

Activity. Materials development was the process through which Lesson Specification Documents (LSDs) were converted into authored and produced instruction. Rather than being one continuous process, the development of materials was an interactive cycle of authoring, review, production, tryout, and final production (see Figure 7 above). The procedures described under this heading pertain only to authoring and production procedures. Quality control procedures are treated in a separate section. This section describes the activity of segment authoring, rough version production, segment revision following small-scale tryout, and segment final production from the diagram in Figure 7.

Segment authoring is generally considered to be a wholly creative process which must be carried out by highly trained psychologist or scriptwriter personnel. An approach was adopted for the SH-2F project that utilized Subject Matter Experts (SMEs) to author instruction of a technically correct, consistent, instructionally effective quality. The authoring system showed itself to be highly useful and productive in SH-2F materials development because it operated with a minimum of necessary training and was capable of providing quite specific guidelines to authors, while leaving the possibility open for "creative overlay" to be added after instructional strategy and technical correctness concerns had been dealt with.

Preparations for authoring using this method included the following:

a. Lesson Specification Documents (LSDs) containing essential items of content, specifications for the strategy to be used for instruction, and specific instructions on how to apply the strategy to the present objective were written by SMEs. LSDs for SH-2F were written during the Phase I portion of this project. A description of the LSD formats and writing conventions can be found in the report of that effort.

b. SMEs were instructed in the techniques for writing individual instructional components which make up instructional strategies. The instruction provided for SH-2F SMEs is described below under "Training." With this instruction, the SME was able to follow the format guides described below and the LSD strategy specification in creating an instructional segment rough draft.

c. Format guides were written to provide the SME with instructions for placing the instructional content in a form that could be easily produced or that could be easily supplemented with a "creative overlay." These instructions depended not only on the instructional strategy involved but on the medium of instruction as well, and stated how the content was to

be structured to fit within the medium. Appendix A contains a format guide for writing Systems Familiarization workbooks, one type of workbook produced for the project.

d. SMEs were provided with a sample of instruction of the same type as was to be written.

Rough version production of an instructional segment took place only after a series of reviews had been carried out (described below under "Materials Tryout") to insure that the content written was technically correct and that it was written in accordance with formatting and strategy guidelines. Rough version production entailed producing instruction in a form suitable for tryout on a small scale. Production costs are large, and tryout version production was kept at the lowest possible level that would not interfere with the purposes of the tryout, while at the same time reducing the amount of additional work necessary to produce the segment in final form. Alternative production cycles were used during the project, producing tryout versions of the various types for each medium in an attempt to find the best combination of these factors for the tryout.

Segment revision following small-scale tryout was essentially a re-authoring process restricted to portions of the instruction pointed out as faulty by tryout data. The guidelines given authors were also subject to tryout data, and as accumulated tryouts showed patterns in revisions required, changes in the guidelines were made.

Final production of segments (ready for large-scale tryout) varied from a full-scale production process to a touch-up procedure depending upon the medium used and the version of tryout material being used at the time. For workbook segments, final production normally included only a tough-up procedure unless graphics or text had been found deficient. For tape/slide segments much production remained following tryout, since a low-fidelity tryout form was used for most. Videotapes did not enter production until all scripts and storyboard ideas had been completely reviewed and approved technically and in terms of strategy. Computer-assisted instruction segments, on the other hand, were entered into the computer before being tried out, since revisions to CAI segments were relatively simple.

Instructional Materials Design--Considerations

A number of considerations which could probably be called psychological considerations went into the design of the instructional materials for the SH-2F project. Though the principles, the considerations about to be enumerated, do not constitute all of the psychological principles built into the SH-2F materials, they constitute the group of properties or considerations which were most consciously emphasized in those materials.

One objective for one segment of instruction. For the purpose of the SH-2F project, one instructional objective gave rise to one instructional segment. Instructional objectives were sometimes, but rarely, included in grouped presentations where more than one objective was instructed at a time. It is felt that one of the benefits of specifying instructional objectives is the focus it makes possible for the student in terms of attention and work direction. It is a common practice among developers to specify individual instructional objectives and then group them into standard 1/2 or 1 hour instructional sessions simply because that is the common length of an instructional period. It is felt this practice defeats one of the important benefits gained from specifying instructional objectives and showing them to the student--specifically, that the student may focus his attention and efforts on the accomplishment of individual objectives rather than a mass of information presented all at once and without the same psychological texture.

For the purpose of the SH-2F project, instructional objectives were treated separately. In the course syllabus, each event that is not an equipment exercise represents one objective's worth of instruction. The sequence is a sequence of instructional objectives to be mastered and not a sequence of class periods or topics.

It is felt that in the long run this approach to syllabus design allows more flexibility in the production of alternate syllabi, necessitated by revisions and rearrangements in squadron and continuation training, refresher training, and alternate track training. In addition, this type of syllabus also means that changes in instructional segments do not need to affect other segments, and revision of instruction for one objective does not require revision of an entire instructional presentation covering several objectives.

Criterion-referenced materials. The instructional materials for the SH-2F project were written according to a principle of development called criterion-referenced instruction. Instructional objectives are used in this method in a very direct way to prescribe the structure and content of instructional materials. Information is not presented under this approach which is not directly related to the accomplishment of an instructional objective. It is expected that the practice and the tests given students will be of the same behavioral form and will relate to the same content as the objective. The SH-2F instructional system constitutes a comparatively austere program in this sense. A large amount of "nice-to-know" information was not included in the instructional materials because it was not required by instructional objectives derived through

objectives hierarchy analysis.

Objective-Practice-Test. One corollary of the criterion-referenced position which should be stressed was used in the development of the SH-2F materials. It states that the behavior in the objective should be the behavior which is practiced and should be the behavior which is tested--whether in a paper-and-pencil or a performance test. It is felt that a common misunderstanding with instruction is that the relationship between objective and practice and test, which should be very close, is often ignored, and tests and practice exercises take on forms differing from the objective and sometimes from each other.

Diagnostic Feedback to Students on Performance Tests. The SH-2F materials were constructed in such a way that students, upon completing equipment exercises in either the weapons system trainer or the aircraft, are given feedback of a diagnostic type on their performance. Specific points of weak performance or strong performance are indicated to students using diagnostic checkcards, described in later sections of this report. It is felt that giving students feedback on specific areas of their performance enables them to concentrate their attention on improving their performance in key areas.

Information-Structured Approach to Materials Design and Organization. An attempt was made in the design of the SH-2F instructional materials to relate the information presented to the student directly to the instructional objective and to eliminate superfluous or nice-to-know information. At the same time an attempt was made to organize the information in the materials for display purposes in such a way that the position in which the information was presented on the page acted as an attention-directing and facilitating key to the student. Highly-formatted and tabular-appearing instructional formats were used. Whereas workbooks are often expected to appear in paragraph form like this report, workbooks for SH-2F instruction more often resemble information matrices with highly structured pages in which only certain items of information are found at a given location on a page. The student passing through such materials encounters these structured pages repeatedly. The effect is that students soon learn how to use the patterned pages to facilitate the uptake of information and become to some degree more responsible for their own learning.

Highly graphic instructional materials. An attempt was also made to make the SH-2F instructional materials highly graphic. Graphics used were of two types: technically relevant, and affectively relevant. Technically relevant graphics were those pertaining to the specific configuration of SH-2F controls or aircraft parts, or which gave cues and information concerning the performance of a maneuver. These were used freely. Affectively oriented graphics were used somewhat less freely but were sprinkled uniformly throughout the materials in such a way that

the deadly serious, strictly technical quality of the instructional materials was avoided. During the tryout of the instructional materials, care was taken to identify those affectively oriented graphics which interfered with learning, and they were removed. Many students during tryout expressed positive attitudes toward the affective graphics spontaneously.

High affect approach to instructional materials. An attempt was made to build as much affective quality into the instructional materials as possible. Instructional graphics, mentioned above, was one approach used to do this, as was the information structured approach, also mentioned above, which it was hoped would have a positive effect on the student's affective response to the materials. Data from program evaluation appears to indicate that this was so. The use of instructional videotapes in the SH-2F program is a particularly visible area in which an appeal was made through affective means to the student's interest. In many of the videotapes, comical situations and technical effects were used in such a way to attract student interest (1) without interfering with student uptake of information or the visibility of that information as it related to the instructional objective and (2) without interfering with the instructional strategies prescribed. On the whole, students, ISD Team members, and instructors exhibited a positive attitude toward these affective aspects of the instructional materials and tend to feel that the materials would be less desirable without them.

Application-oriented approach. An attempt was made in designing the SH-2F instructional materials to provide students with that information which was most directly job-relevant and to eliminate information which was unnecessary and which would not be applied during job performance. An attempt was made where possible to state instructional objectives in action terms which most closely approximated on-the-job behaviors. Though there was a necessary substrate of verbal information behaviors in the instructional objectives, the attempt was made even in those verbal information objectives to provide the student with action-oriented, application-oriented presentations.

Course Design--Considerations

In addition to the design of specific instructional material formats and characteristics, care was given prior to materials development to course design for the pilot and sensor operator courses. Reference has already been made to specific attempts to endow the instructional materials themselves with interesting characteristics. Other properties of material construction and use were designed to attract student interest and make the instructional materials easy to use, revise, and manage. Some of those characteristics were:

a. Portability. The instructional materials were made as portable as possible and therefore as simple as possible and in media which were as standard as possible. Media presentations which required unnecessarily complicated or expensive equipment were avoided. Instructional materials produced for the SH-2F program were designed to be used at remote locations on easily obtained instructional devices standard throughout the Navy. Therefore, it is anticipated that they will be used aboard ships and at student residences, as well as in the Learning Center.

b. Referenceability. It was felt that following the use of the instructional materials for first-time instructional purposes, information in the materials should be easily referenced and that information should be found in them without requiring much searching. This was another factor which supported the adoption of an information-structured approach to materials design and organization. It is felt that information contained in SH-2F materials is easily referenced.

c. Variety. An attempt was made to use variety as a property of the instructional materials by spreading the instructional presentations as much as possible across a range of media devices. Not just one media device was chosen for the presentation of the materials, but several media types were used. And within one media type very often at least two and sometimes more specific organizational formats were chosen for the presentation of the instructional materials. It is felt that this variety avoided some of the pitfalls of overstandardized and sometimes tedious instructional materials.

The SH-2F pilot and sensor operator courses were designed in such a way that they were capable of presentation in self-study mode and individually paced mode, should that be desired by the using commands. The restraints limiting the design of the instructional materials included the following:

1. Cost to produce instructional materials.

2. Facilities available to produce instructional materials.

3. Ease of authoring materials.

4. Time required to author instructional materials.

Description and sample of materials produced. For the SH-2F pilot and sensor operator courses, instructional materials were produced of the types and in the amounts in Table 14 below.

TABLE 14. TYPES AND AMOUNTS OF MATERIALS PRODUCED

MEDIUM	NUMBER OF SEGMENTS PRODUCED	AVERAGE LENGTH*	RANGE*	APPROX SEGMENT* DURATION (INCLD EXERCISES)	TOTAL TIME (HRS)
Workbooks	333	5pp	3pp - 40pp	15 min	83.3
Tape/Slide Presentations	141	Time: 4 min Slides: 30	2 min - 12 min 15 slides - 175 slides	---	9.4
Videotapes	32	12 min	3 min - 30 min	---	6.3
CAI/Random Access Segments	96	---	---	20 min	32
S-3A CAI Segments	34	---	---	20 min	11.3
Performance Checksheets	521	1 pg	1 pg - 2pp	---	---
Lesson Tests	134	1 pg	1 pg - 2pp	---	---
TOTALS**	602	---	---	---	131.0

*Estimated
**Excluding S-3A borrowed segments, performance checksheets, and lesson tests.

During the process of authoring instructional material, media selections, objectives, and the course sequence were modified somewhat. As will be described in a later part of this report, sequences of instruction used on the East and West Coasts differ somewhat. The instructional segments and tests used on both coasts, however, are the same.

Production of segments - Workbooks. The production cycle used for production of workbooks is presented in Figure 8 below. This flow of activities represents the idealized process, and it should be remembered that the process was modified from an earlier, less satisfactory, version and that it was also modified from time to time as time and personnel availability factors demanded. Throughout the course of the production period, the process came under frequent review and was changed to reflect lessons which were learned along the way.

Samples of a workbook at various stages of authoring and production are presented in Appendix B of this report.

Production of segments - Tape/slide presentations. The production cycle used for preparation of tape/slide segments is presented in Figure 9 below.

Appendix C contains samples of scripts, storyboards, and art used for tryout and revision purposes. The first draft storyboard contains the script written by the author and edited by the scriptwriter along with the artist's concept drawing which arose out of a conference between the artist, the SME, and the IDT or IP. The art in the appendix is the art resulting from those concept sketches. Note that some revisions have been made between the storyboard and the art stages. These revisions are the product of a review that took place between the artist's conference and the production of the art for tryout. Finally, a revised script is presented showing the types of revisions which normally resulted from a tryout. This script is not the same as the first script shown, but the level and types of revisions are about the average.

Production of segments - Videotape. The production cycle used for videotape segments is presented in Figure 10 below. The videotape cycle is much more complex in terms of scheduling, coordination, and equipment than the cycle for any other media used in the SH-2F system.

Appendix D contains a vdieotape LSD, a preliminary author's script, and a scriptwriter's final script for one videotape. No formal tryout was conducted beyond the reviews by the SME and senior SME because of the unavailability of a low-cost and time-effective tryout version which it was felt conveyed with sufficient fidelity the characteristics of the videotapes. Therefore, tryout and revision samples are presented.

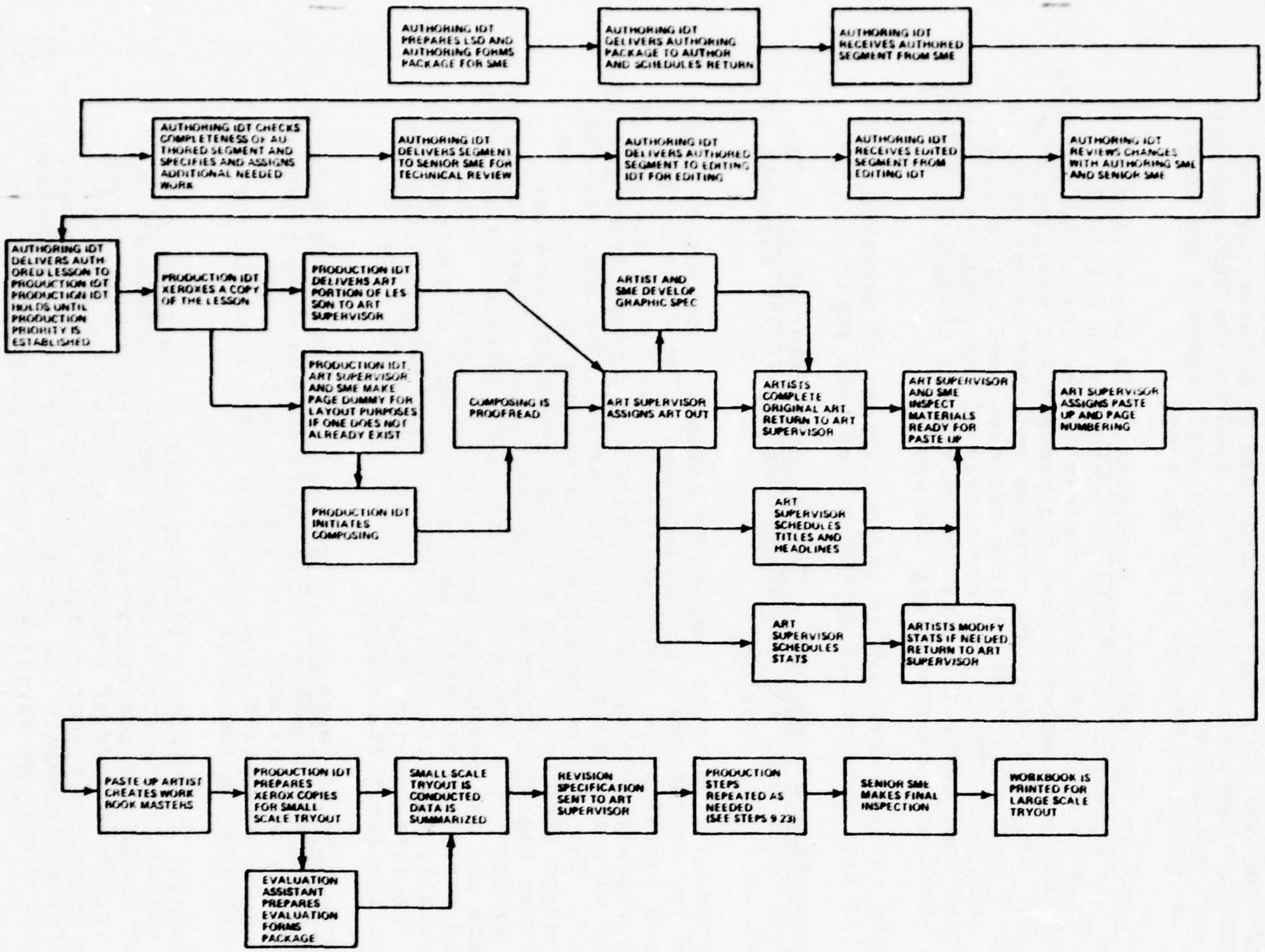

Figure 8. Workbook Authoring and Production Process

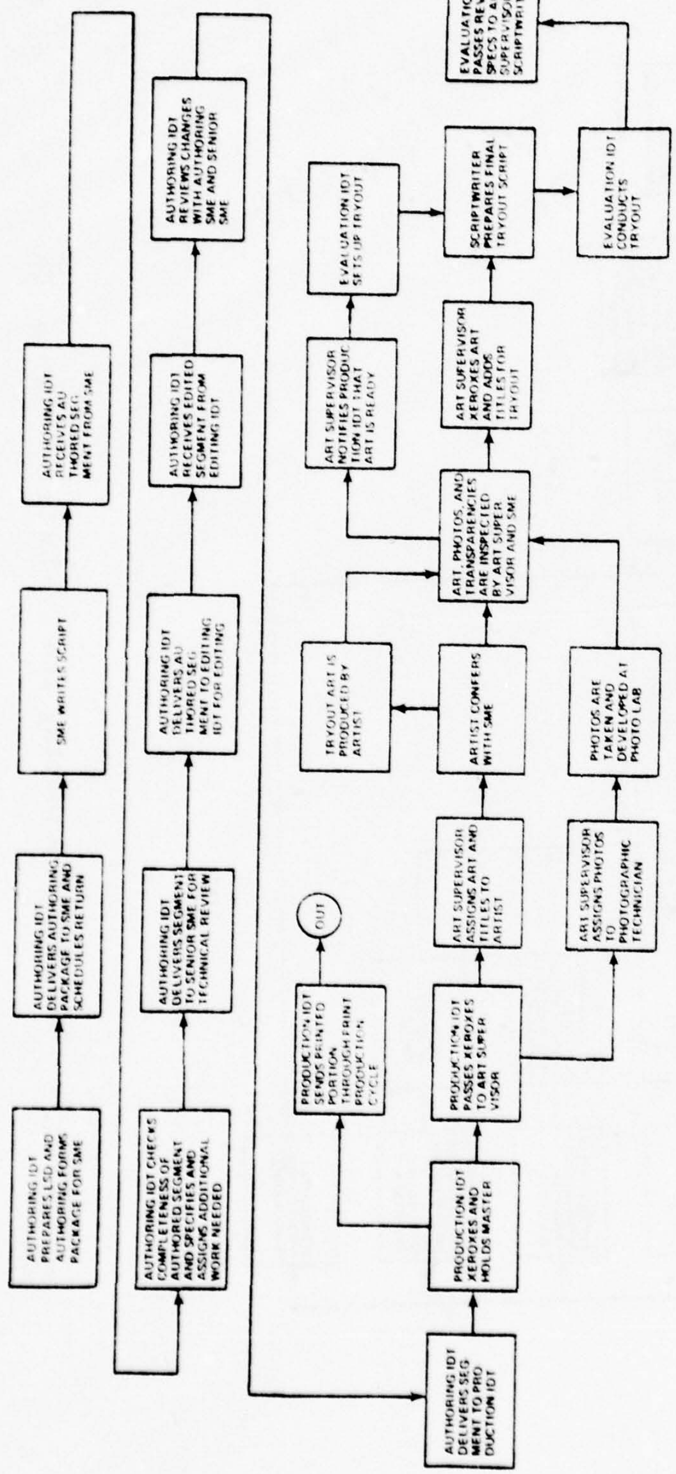

Figure 9. Tape/Slide Authoring and Production Process

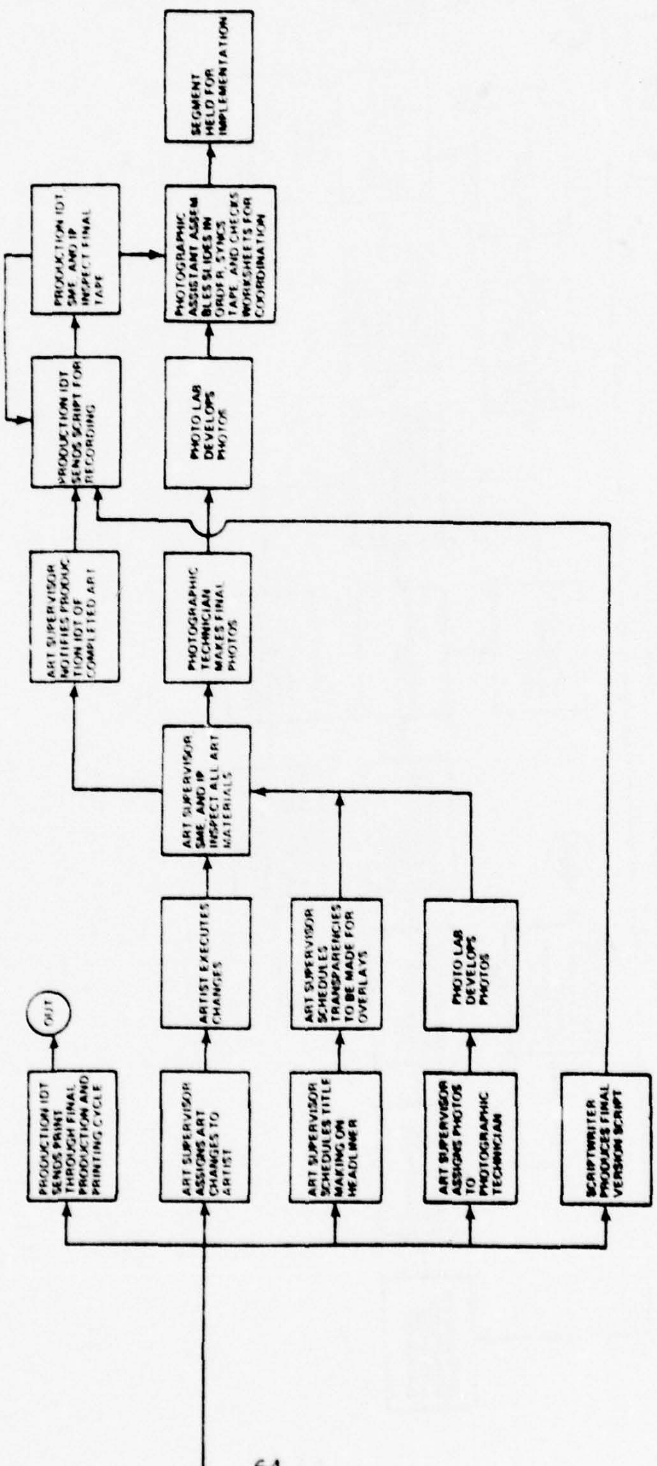

Figure 9. Tape/Slide Authoring and Production Process (Cont.)

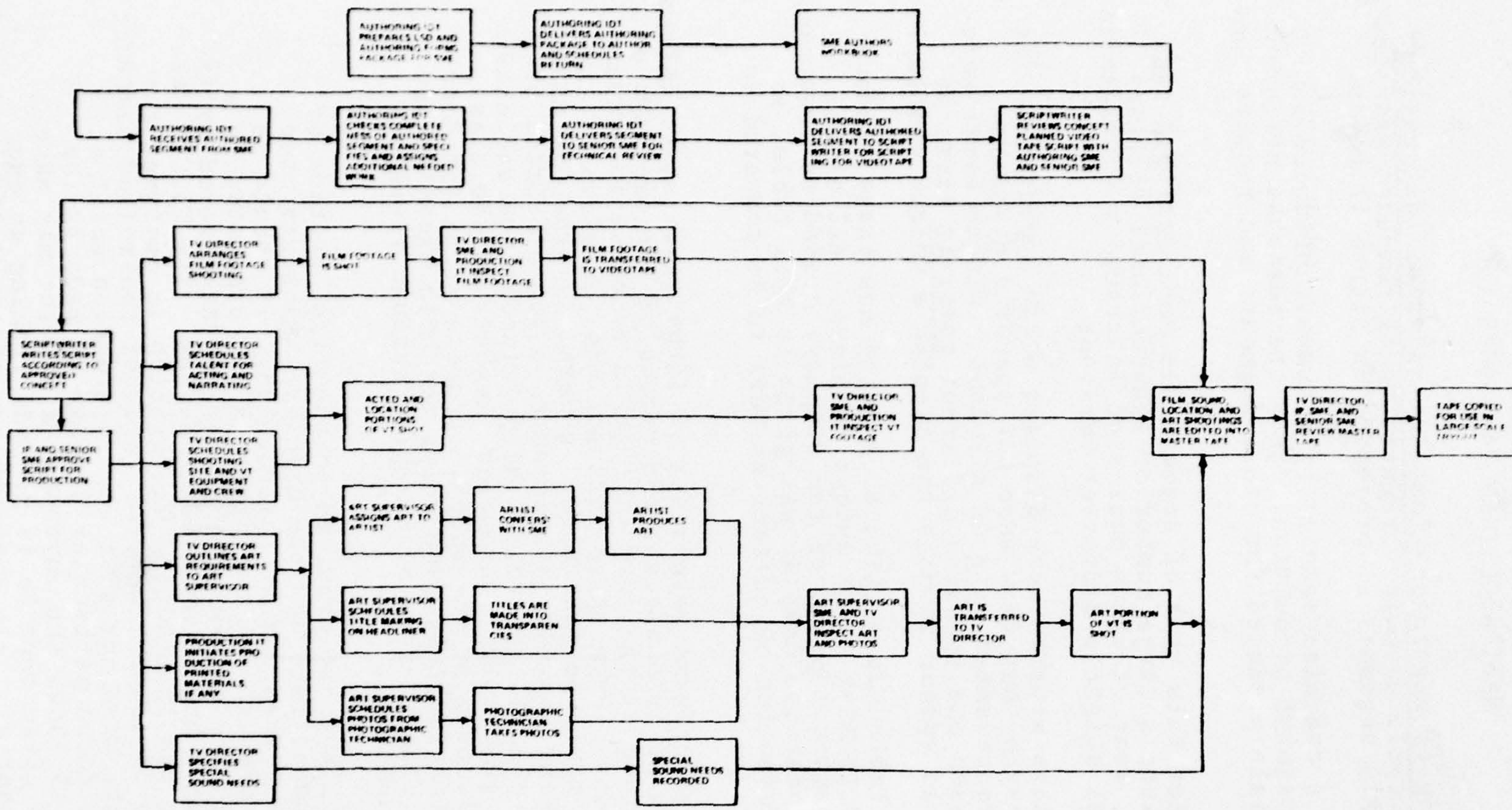

Figure 10. Videotape Authoring and Production Process

Production of segments - Computer-assisted instruction. The production cycle used for preparation of computer-assisted instruction (CAI) segments is presented in Figure 11 below.

Appendix E contains samples of documents produced as part of a CAI segment production. They are somewhat different from the materials produced for other segments and require some explanation.

The LSD for this type of segment was more detailed than other LSDs because a large number of instructional displays were specified, some of which possessed interactive characteristics and several slightly different versions.

The displays written were displays which appeared on the CAI terminal screen, but they were not specific displays. Instead, they represented sets of displays. Window areas were designated on each one in which different specific items of information could appear to make the display a unique display.

The Item Table was written to specify how those windows would be filled to make those unique displays. All of the information (component parts of the display) needed to construct one example or practice display was given in this table, as well as the information on correct answers to be compared to student answers.

The packaging forms were a set of forms required to inform the computer how to assemble all the pieces of the displays on the terminal screen at the correct time in response to student commands or inputs. From these instructions, displays of the following types could be generated: generality (the one main idea of the segment, a rule, a procedure, a set of facts, or a definition of a class), generality help (elaboration and clarification of the generality), examples (members of the class, samples of application of the rule), practice items (student-response-required examples), and helps for both examples and practice items (elaborations of examples through attribute isolation and labeling).

Sample displays are provided in the final section of Appendix E to demonstrate how the display components were assembled on the screen during instruction. It should be remembered that even though the displays are presented in a fixed sequence in the appendix, they may be encountered by the student in any of a huge number of sequences. The TICCIT CAI system for which the instruction was written is designed for maximum response to student control (learner controlled instruction) and, in fact, does not give any instruction until a specific request for a particular display is made by the student. Table 15 shows the movements a student may make to a new display given that he is already looking at one display. Note that all help displays are accessed directly

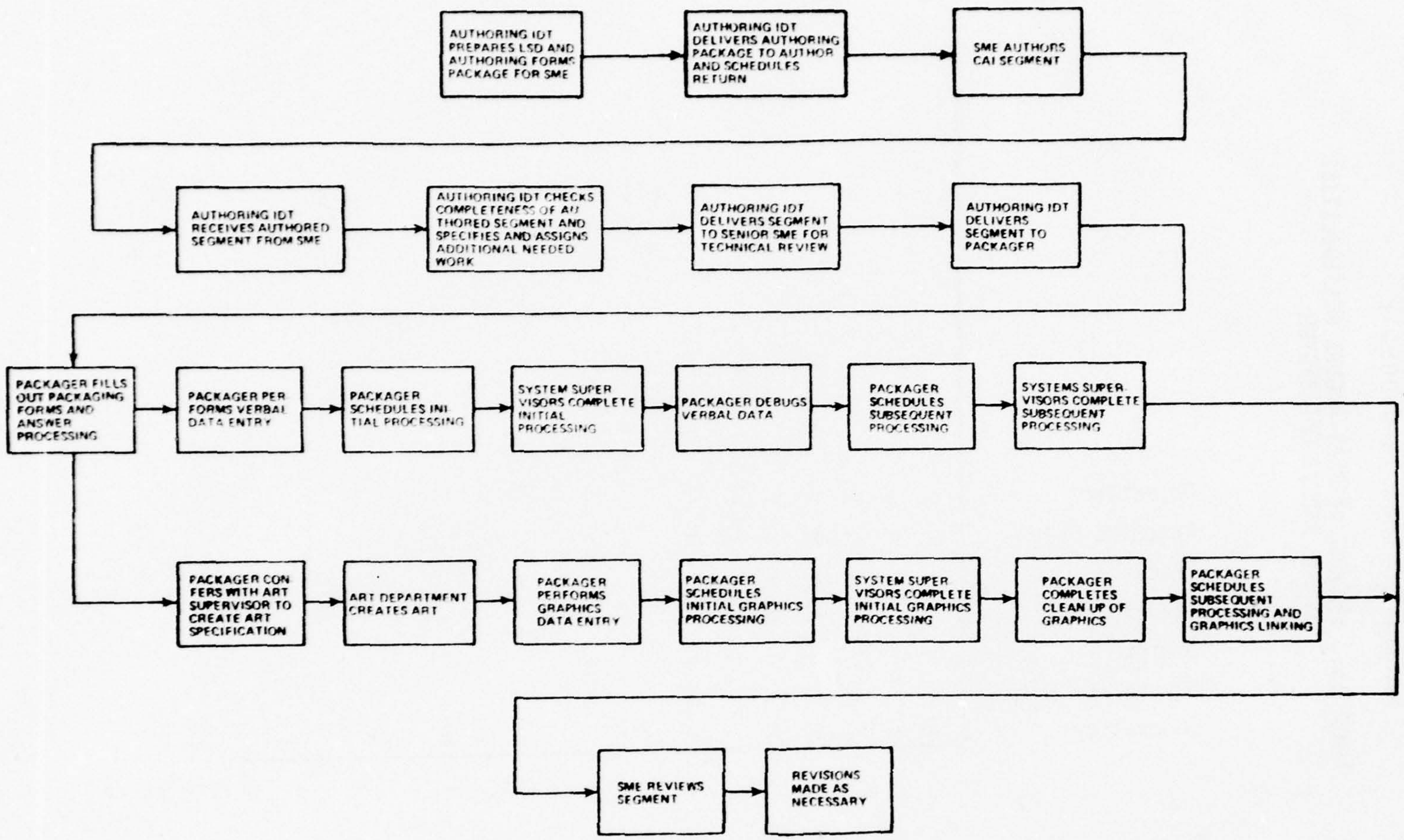

Figure 11. Authorizing and Productio Process for Computer-Assisted Instruction Segments

TABLE 15. STUDENT DISPLAY ACCESS POSSIBILITIES ON THE TACCIT CAI SYSTEM

From Display \ To Display	Generality	Generality Help	Example	Example Help	Practice	Practice Help	Objective
Generality	//	Y	Y	N	Y	N	Y
Generality Help	Y	//	Y	N	Y	N	Y
Example	Y	N	//	Y	Y	N	Y
Example Help	Y	N	Y	//	Y	N	Y
Practice	Y	N	Y	N	//	Y	Y
Practice Help	Y	N	Y	N	Y	//	Y
Objective	Y	N	Y	N	Y	N	//

(NOTE: Y-Yes
N-No)

only from the display they help. All "N's" on the chart are a result of this fact, indicating that a student has virtually free travel through the displays.

Authoring progress reporting. For the authoring process a daily report was kept of progress so that projections could be made from observed authoring rates to see if project deadlines were being met. Figure 12 below is a sample of the form used for this purpose. Entries in the left column are used for author names, and the central portion of the form is used to record the amount of time available from each author for authoring purposes. The right-hand section of the form records the quantity of segments authored during the month in each medium. This tabulation made it possible to determine average authoring rates for each author for each medium. The data became quite useful at those times when questions of adequate SME support arose, and they were used as the basis for SME need calculations.

Production tracking and progress reporting. During materials authoring and production, there quickly arose an imperative need for a tracking and progress-reporting system which could be used to determine the status of individual segments of a daily and, if desired, hourly basis without requiring large amounts of personnel time.

The tracking system made use of a coupon sheet which was made up for each medium. A sample sheet for workbook production is found in Figure 13. Each step in the production process was represented on the coupon sheets, with the first steps performed at the bottom. As each step was completed, the worker completing it clipped the coupon, filled out the relevant data called for on it, dropped the coupon in a collection box, and advanced the segment to its next station. With a minimum of quick bookkeeping, the coupons were posted to a master record from which summary reports were easily obtained. Progress reporting by this system was able to show the numbers of segments at each step of production and made it possible to identify bottlenecks in the cycle very easily.

Government-furnished resources. A list of government-furnished resources is presented in Table 16 below. In general, the government was tasked with furnishing work areas, furnishings, production and reproduction facilities and some personnel, xerox facilities, a composer, and supplies for reproduction and duplication of materials.

Contractor-furnished resources. The contractor was tasked with furnishing expendable supplies required for the production of materials masters. To fill an unexpected need, some artist desks and lamps were also supplied. Also an audiotape duplicating facility was provided by the contractor for duplicating audio-cassettes from other audiocassettes. Contractor-furnished resources are enumerated in Table 17 below.

AUTHOR	WORKING DATES																							NO AND TYPE SEGMENTS AUTHORED						
	APRIL																							WORK BOOK	TAPE SLIDE	R/S	V/T	EQUIP W/B	CAI	TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23							
KEY: P = POS F = FLIGHT L = LEAVE S = SYLLABUS T = TAD G = PRODUCTION I = IFTD																														
																	TOTAL													

Figure 12. Authoring Production Progress Report Form

DATE	INITIAL	WORKBOOK SEGMENT	STEP
			COMPLETE
			GRAPHIC REVISION
			AUTHOR REVISION
			STUDENT EVALUATION
			SME REVIEW
			PASTE UP
			COMPOSED
			ART WORK
			PRODUCTION
			IDT REVIEW
			AUTHORED
			READY FOR AUTHOR

Figure 13. Production Progress Reporting "Clip" Sheet

TABLE 16. GOVERNMENT-FURNISHED RESOURCES

Artist Desks, Stools, and Lamps

Work Space and Furnishings (Decks, Chairs, Bookshelves, etc.)

Composer

Xerox Machine and Paper

35mm Film (½)

Audiotape and Videotape Duplicate Cassettes

Videotape Studio and Crews

Audio Recording Studio

Printing Facilities

Photostatic Camera Use

Lab Service for Reproduction of Slides

Combat Camera Motion Picture Services

TABLE 17. CONTRACTOR-FURNISHED RESOURCES

Artist Supplies and Tools

Office Supplies

Cameras

Photo Stand

35mm Film (½)

Photostatic Paper

Audiotape and Videotape Master Tapes

Audiotape Duplication Facilities

Personnel Requirements

Manpower requirements for the total materials development process (including segment authoring, rough version productions, segment revisions, and final production) are reported in Table 18 below.

Training. Training in Materials Development procedures for project SMEs was conducted 12-16 January 1976 at NAS, North Island for all members of the ISD Team. A schedule of the training is presented in Table 19. The training covered use of instructional strategies, instructional component writing, and use of formats in writing for specific media.

Problems and solutions. There were some problems associated with authoring of materials and revisions after tryout, but for an undertaking the size of the SH-2F effort, using personnel drafted from other duties, as much would be expected. Problems centered around the fact that a staff of authors were attempting to carry out functions for a novel task (writing adequate instructions) in a changeable task environment (due to format changes), in a short time frame, while also attempting concurrently to carry out their main duties of flying and instructing.

Format guide changeability. The changeability of the format guides at the beginning of authoring pointed out the need for a short interim period of planning and design prior to the beginning of authoring. Guides provided to SH-2F SMEs at the training sessions were modified as authoring progressed. Though some changes were anticipated from the outset, it is felt that additional planning time inserted into the project time line would have allowed more careful plans to be made and tested by contractor personnel, reducing the amount of format change and avoiding frustrations for the authors caused by the changes.

Low motivation for authors. In the ISD organizations currently organized, personnel are drawn from operational squadrons and training squadrons and soon find that the assignment they have been given is not a career enhancing position. Furthermore, they discover that it is not an assignment they have been trained for. Consequently, many look upon the duties of authoring and helping to design instruction as burdensome and professionally non-productive. It becomes difficult in this environment to expect consistently high quality instruction to be written with the necessary attention to detail and with perserverance. The SH-2F project was fortunate in that most of its SMEs were interested enough in the project to do quality work, which insured the instructional materials produced were technically correct and produced in a timely fashion. The staffing was such, and time at such a premium, that those SMEs who were not sufficiently motivated caused difficulties for the entire ISD Team.

TABLE 18. MANPOWER REQUIREMENTS FOR MATERIAL PRODUCTION

PERSONNEL CLASSIFICATION	MAN-DAYS EXPENDED									
	TOTAL PROJECT MAN-DAYS	SEGMENT AUTHORING		ROUGH VERSION TYPING		SEGMENT REVISION		FINAL PRODUCTION		TOTAL MAN-DAY % USED
		MD	%	MD	%	MD	%	MD	%	
NAVY										
ISD Team Leader	165	16.5	10	0	0	16.5	10	0	0	20%
Pilot SME & Sr SME	391.5	176	45	29.4	7.5	58.7	15	29.4	7.5	75%
AW SME & Sr SME	873.4	393	45	65.5	7.5	131	15	65.5	7.5	75%
CONTRACTOR - On-site										
Project Director	245	24.5	10	12.3	5	24.5	10	12.3	5	30%
IT	700	70	10	35.1	5	315	45	35	5	65%
Secretarial	256	38.4	15	0	0	38.4	15	0	0	30%
Production	2458	0	0	983.2	40	0	0	1474.8	60	100%
CONTRACTOR - Off-site										
Managerial	99	0	0	0	0	0	0	0	0	0%
Secretarial	224	0	0	0	0	0	0	0	0	0%
Production	191	0	0	0	0	0	0	0	0	0%
IP	146	0	0	0	0	0	0	0	0	0%

TABLE 19. TRAINING SCHEDULE FOR AUTHOR TRAINING

SCHEDULE
INSTRUCTIONAL PRODUCTION COURSE
NAS NORTH ISLAND
12 January - 16 January 1976

MONDAY, 12 January -

9:00	Welcome - Gene Regard
9:05	Introduction to the Systems Approach
10:15	Break
10:30	Introduction to the SH-2F Project
11:30	Questions and Answers
11:45	Lunch
1:15	Instructional Strategies
2:30	Break
2:45	Instructional Strategies (Continued)
4:00	Adjourn

TUESDAY, 13 January -

8:30	Writing Generality Helps
9:30	Break
9:45	Writing Instances
10:45	Break
11:00	Writing Instances (Continued)
12:00	Lunch
1:30	Writing Instance Helps
2:30	Break
2:45	Writing Tests
3:45	Adjourn

WEDNESDAY, 14 January -

8:30	Writing So What and Introductions
9:30	Break
9:45	Introduction to Formats
10:30	Break
10:45	Random Access Formats
11:45	Lunch
1:15	Practice
2:15	Break
2:30	VT Scripts
3:15	Practice
4:00	Adjourn

THURSDAY, 15 January -

8:30	Tape Slide Scripts
9:45	Break
10:00	Practice
11:30	Lunch
1:00	Systems Workbook Formats
2:00	Break
2:15	Memory Workbook Format
3:00	Break
3:15	Practice
4:00	Adjourn

FRIDAY, 16 January -

8:30	Trainer/Flight Evaluation Formats
9:30	Break
9:45	Practice
10:45	Break
11:00	CAI Writing
12:00	Lunch
1:30	CAI Writing (Continued)
2:30	Break
3:00	TICCIT Demo
4:00	Adjourn

Content knowledgeability. One of the problems in any community that desires to do training is finding SMEs who are sufficiently expert that they can work with the content easily and confidently. It is difficult to find a SME sufficiently well-prepared to write training materials. If this should seem strange, consider the problem that the average driver would have in writing a manual on driving which was detailed enough to prevent accidents and allow students using the materials to drive safely under all conditions, observing fully the details of driving technique. Even in driving, there are standards of distance and timing and visibility which make it difficult for the average driver to recall from memory all of the procedures to be followed, their exact parameters and their variations due to local circumstances and operating policy. Content knowledgeability was a problem which was troublesome in the authoring of the SH-2F instructional materials, but it is a problem which will exist in virtually any development project which seeks to detail a body of content. The SH-2F project was fortunate to have SMEs who were willing to consult doctrinal publications in search of the specific parameters and procedures followed in executing their jobs.

Author availability. Because of the parallel duties which SH-2F authors had in addition to their authoring responsibilities, it became difficult for them to find sufficient time to concentrate on the authoring process. This led to the problem of not having sufficient numbers of authors to complete the authoring task. When this problem was determined early in the project additionally authors were asked for and obtained through the efforts of the ISD Team leader and the Wing.

Need for editorial support. Subject matter experts, given proper techniques to follow, can author instructional materials of a consistent technical quality whose effectiveness can be relied upon. Most subject matter experts, however, vary in their abilities to write readable instructional prose. Consequently, materials produced by different authors are produced in varying degrees of useability, and most require editorial review and correction by someone knowledgeable in instructional technique and standard language practices before they are ready for production as instructional materials. The editorial review insures the consistency of the materials in quality, the absence of confusing or incomplete verbal content, and in some cases, suggests better ways of expressing the content for more effective instruction. For the SH-2F project, the contractor supplied an editorial review for tape/slide, workbook, videotape, and CAI segments. Although that function was not originally anticipated, future projects should recognize the need for this editorial capability, and staffing patterns should be adjusted accordingly.

Unauthorized changes. One difficulty which was encountered was to maintain the decisions which had been made prior to the production process and eliminate unauthorized and unrecorded changes to those plans. The changing of instructional objectives without proper recording and correlating activities caused some distress for the production system and caused lessons to be produced which did not fit the needs of the system as planned. One thing which the contractor might have improved during the production of SH-2F instructional materials was the mechanism for recording changes to instructional objectives, to lesson specifications, to testing procedures, to strategy prescriptions, and to lesson sequences. Some disorganization resulted from time to time when unauthorized changes were discovered either in the materials, the objectives, the strategies, or the sequence, and some time was spent correcting unnecessary problems which could have been avoided through a more carefully designed mechanism for change, approval, and recording.

No particular problems were encountered during rough version production.

One problem was encountered during segment revision, which is discussed below.

Author reviewing requirements. SH-2F project SME staffing did not provide sufficient subject matter expert time to allow careful review of all authored materials for technical correctness concurrent with authoring of segments. Consequently, when authoring had been completed for a sufficient number of segments and the review for those segments came due, portions of the time which had been available for authoring and instruction disappeared so that the review could take place. This caused production of the instructional segments to level off more quickly than was expected. A careful technical review of instructional materials early in authoring and production is critical in the saving of time and money on later production steps. Future projects should be more careful to plan sufficient subject matter expert support, both on-and off-site, to give instructional materials sufficient review early in the formative phases, while also allowing high levels of authoring to continue.

The following problems arose during final production.

Technical errors. The need for adequate review mentioned above was emphasized during final production of instructional materials when it was discovered that in some cases segments of instruction had proceeded completely through the writing, reviewing, tryout, revision production processes still containing technical errors. This problem was particularly evident in the production of tape/slide presentations for which there was a heavy (somewhat expensive) art requirement. It is

estimated that 20% of the artist hours expended on tape/slide presentations were spent correcting errors which had not been discovered through the review and tryout cycle. The contractor also found, with respect to its own personnel, that more stringent control was necessary to eliminate typographical errors and errors of production quality.

Production resources. One problem which might have occurred on the SH-2F project but was precluded through foresight and cooperative local commands, was the difficulty in producing large amounts of media in a short period of time. For tape/slide production, for instance, large numbers of photographs need to be developed and duplicated in a short time. For workbooks, large amounts of printing, photostatic copying and other processes need to take place in a short period of time and need to be of high quality to be useable. Through the foresight and cooperation of the AIRPAC Educational Specialists Office, the Combat Camera Group, the Public Affairs Office Television Studio, and the FASOTRAGRUPAC ATA Library, these production needs were met in a timely fashion and in a cooperative atmosphere. Without this cooperation the completion of the project would have been doubtful.

MATERIALS TRYOUT

Activities. Materials tryout is the process in which instructional materials which have been authored according to a strategy prescription are subjected to a series of reviews and tryouts for the purpose of screening out technically incorrect information and for the purpose of insuring that the instructional strategies prescribed and created were appropriate, were properly executed, and are effective when used by small groups of representative students.

Materials tryout is a process which parallels materials development (see Figure 7 above). In materials development, instructional materials are authored according to a prescription. During materials tryout, materials which will eventually be parts of an entire course are tested individually and revised as necessary in much the same way that parts of a complicated machine are tested individually before they are assembled.

Those parts which do not meet specifications are, of course, reworked. An overview of the tryout steps and how they related to production steps is presented in Figure 14 below. Double-lined boxes on that figure indicate tryout steps. The four subprocesses of the SH-2F project materials tryout phase were (see Figure 7 above):

1. Senior Subject Matter Expert Review.
2. IP Review.
3. Small-Scale Tryout.

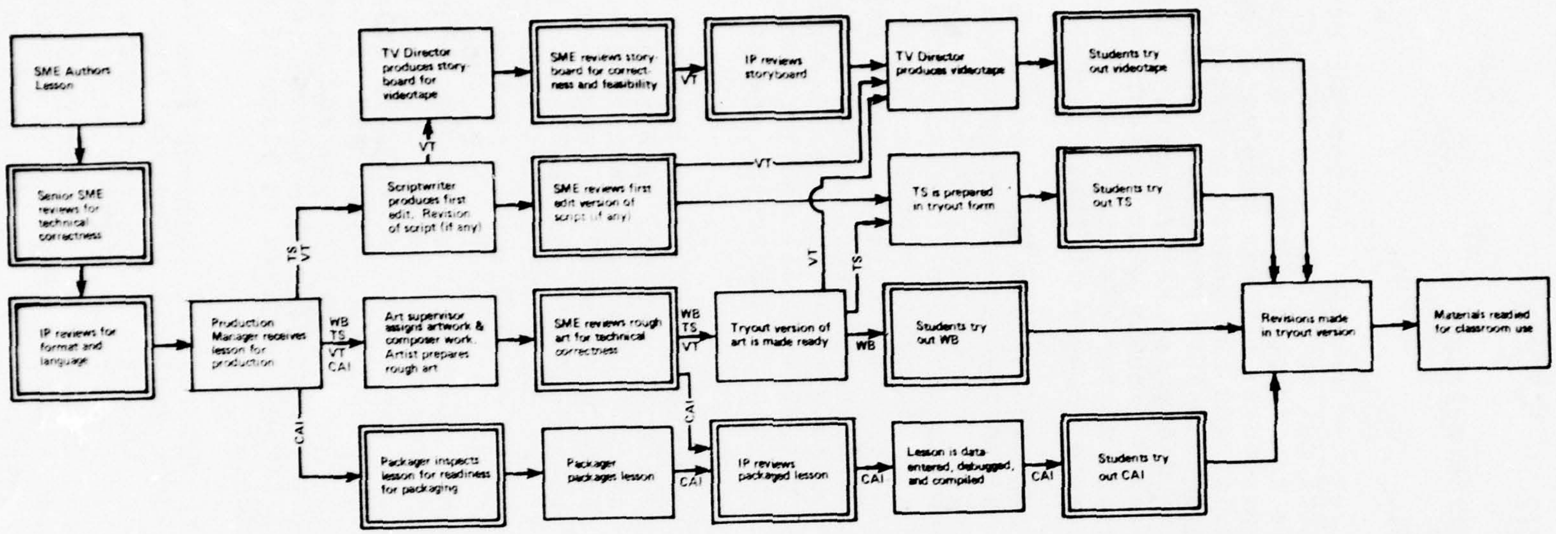

Figure 14. The Lesson Development Process with Tryout Steps Indicated

4. Revision Specification Writing.

Each is described below.

Senior subject matter expert review. Senior SME review was the process in which instructional materials once authored were screened by SMEs responsible for reviewing the instructional materials for technical correctness. It was surprising to find that even in areas of the pilot and the sensor operator jobs, which are fairly well defined in NATOPS and other technical manuals, variances of opinion did exist between practitioners, and uncertainties occurred as to exactly what the correct procedure was. The senior subject matter expert review was the arbiter in questions which arose because of these factors.

IP review. IP review followed senior SME review. Its main purpose was to ensure that the instructional prescription written in the lesson specification had been properly followed and that the instruction which had been authored met the standards for useable instructional material. In reality on the SH-2F project, an IP was often not available for this review. It was possible, however, to use well-trained and experienced instructional technologists to make this review without decrementing the quality of the instructional materials. All instructional materials received at least one senior SME review and at least one IP or IT review.

Small-scale tryout. According to the provisions of the SH-2F Evaluation Plan, instructional segments were tried out on a small-scale basis to test their affect-and mastery-producing properties. An attempt was made throughout the length of the materials tryout phase to obtain students who were naive in terms of the instructional content, yet ready for instruction on particular topics. In most cases this was achieved. Some problems were encountered which are discussed later in this report. In later portions of the project, a technical review was adopted which consisted of a final SME review, replacing the small-scale student tryout. This technical review was adopted in cases where instructional formats had been prescribed, used, and tried out on a small scale several times. When it became apparent that the instructional formats themselves were effective across several content areas, the technical tryout was used in place of the small-scale tryout with students.

A typical small-scale tryout session involved from 1-3 and rare cases up to 5 naive student subjects. The evaluator began by giving the group of tryout subjects instructions and a brief introduction to the purpose of the tryout. The instructional materials were then presented, followed by a mastery test, and an attitude questionnaire (a sample of which is presented in Table 20). The attitude questionnaire was designed to measure the students affective responses to the instructional material.

TABLE 20. A STUDENT ATTITUDE QUESTIONNAIRE

2.0 STUDENT ATTITUDE MEASURES

Segment No. ____________ Segment Title ________________________

Students Reporting ____________ Location ________________________

Place totals in each box to indicate student responses.

Item	Total	Response
1. RELEVANCE: In relation to my job and career, I considered the instruction		a. extremely relevant
		b. relevant
		c. irrelevant
		d. extremely irrelevant
2. ENJOYMENT: The instruction was		a. extremely enjoyable
		b. enjoyable
		c. unenjoyable
		d. extremely unenjoyable
3. AMOUNT: The amount of information covered in this segment was		a. overwhelming in the time allotted
		b. kept me busy
		c. easily completed in time allotted
		d. completed almost immediately
4. INTEREST: The material covered is		a. extremely interesting
		b. interesting
		c. boring
		d. extremely boring
5. CHALLENGE: The instruction in this segment was		a. too demanding
		b. challenging
		c. not really challenging
		d. too simple

TABLE 20. A STUDENT ATTITUDE QUESTIONNAIRE (CONT.)

( ) Place a check mark in the appropriate box

6. PREFERENCE: If given a choice for future instruction I would		a. like to take more instruction in this form
		b. not like to take any instruction in this form (If b chosen fill in c)
		c. Suggest ________ form for this instruction
7. QUESTIONS: The instruction allowed for		a. opportunities to get unclear points clarified
		b. not enough opportunities to get unclear points clarified
8. ORGANIZATION: The concepts in the instruction of the material in this lesson were		a. extremely organized
		b. organized
		c. unorganized
		d. completely unorganized
9. TESTS: I found tests		a. covered only the instructional materials
		b. covered material not included in the instruction
10. FEEDBACK: Opportunities for feedback were		a. completely adequate
		b. adequate
		c. inadequate
		d. completely inadequate

TABLE 20. A STUDENT ATTITUDE QUESTIONNAIRE (CONT.)

( ) Place a check mark in the appropriate box

11. MATERIALS: Audio/Visual aids, workbook formats were

	a. extremely easy to understand
	b. understandable
	c. difficult to under-stand
	d. completely confusing
	e. If C and/or D, please specify -

Finally, an interview was conducted with the students. During this interview, specific comments were elicited on the properties of the instructional materials which were pleasing or displeasing or which the students perceived to be effective or ineffective instructionally. The students were asked to compare the instruction with other instruction which they had received. When weaknesses were identified by the students within the instructional materials, an attempt was made to have the student point out the specific source of the weakness, so that the revision of the instructional materials could represent the necessary changes. For this purpose, the materials were actually marked by students with corrections and suggestions.

The data from the tryout was recorded for each individual segment and was summarized on a set of forms presented in Table 21. During the course of the tryout, a special Tryout Data Report was delivered monthly under the terms of the contract. A sample of the report is presented in Table 22. The report contained the data from the Segment Evaluation Summary Sheets. Appendix F presents the data actually collected during small-scale tryout.

Revision specification writing. Revision specification writing took place as a result of the tests and interviews from the tryout. Revision specifications in most cases took the form of actual changes made to instructional materials which had been tried out. Very often, these revisions involved changes in wording, corrections of content which had been stated incorrectly, instructional prescriptions which had been followed incorrectly, or the revision of certain graphical or layout properties of the instructional materials. These revision specifications were written so that revisions could be made and the final instructional materials produced.

Personnel Requirements

Manpower requirements for the entire materials tryout process (including senior SME review, IP review, small-scale tryout and revision specification) are reported in Table 23 below.

Training. The activities of the materials tryout phase were conducted mainly by contractor personnel. Therefore, it was unnecessary to train Navy SMEs to conduct the materials tryout. SMEs were familiarized with the tryout process, however, during initial authoring training and were further exposed to the details of evaluation when they helped conduct evaluations.

Problems and solutions. Two main problems occurred during the materials tryout phase. They were: lack of available SME time for review purposes, and impending deadlines in the face of large amounts of materials still needing tryout. Each of these problems is treated separately below.

TABLE 21. A SEGMENT EVALUATION SUMMARY

SEGMENT NO. ________________ INSTRUCTION DATE __________

EVALUATION DATE __________

EQUIPMENT ________________

____

____

____

Type of Instructor needed for instruction

____________________ Detachment Experience

____________________ Qualified HAC

____________________ RAG Graduate

____________________ Proctor (no pilot experience necessary)

Type of Instructor required to Administer test

____________________ Detachment Experience

____________________ Qualified HAC

____________________ RAG Graduate

____________________ Proctor (no pilot experience necessary)

____________________ No test

NAMES OF STUDENTS

1. ____________________ 6. ____________________

2. ____________________ 7. ____________________

3. ____________________ 8. ____________________

4. ____________________ 9. ____________________

5. ____________________ 10. ____________________

TABLE 21. A SEGMENT EVALUATION SUMMARY (CONT.)

STUDENT	TOTAL ANSWERS	TOTAL TIME		NUMBER OF CORRECT ANSWERS REQUIRED FOR MASTERY	CORRECT ANSWERS ACHIEVED	
		INSTRUCT-ION	TEST		TOTAL	%
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Total number of students achieving mastery

Percentage of students achieving mastery

Remarks:

TABLE 22. A MATERIALS TRY-OUT DATA REPORT FORM (COVER SHEET)

1.0 MONTHLY TRY OUT SUMMARY

The results of this month's materials try-out are summarized in the table below:

MEDIUM	SEGMENTS TRIED OUT	SEGMENTS MEETING MASTERY CRITERION	TYPE OF REVISION REQUIRED		
			MASTERY	TECHNICAL	FORMAT
T/S					
WB					
CAI					
V/T					
R/A					

2.0 CUMULATIVE SUMMARY

The table below summarizes progress of the try outs to date.

MEDIUM	SEGMENTS TRIED OUT	TOTAL SEGMENTS
WB		
VT		
CAI		
TS		
EO		

3.0 COMMENTS

FIGURE 22. A MATERIALS TRY-OUT DATA REPORT FORM (CONT.)

Seg.	TITLE	Media	Pt. Poss.	Student Scores								Revise Mast.	Revise Tech.	Revise Form		
				1	2	3	4	5	6	7	8					

TABLE 23. MANPOWER REQUIREMENTS FOR MATERIALS TRYOUT

PERSONNEL CLASSIFICATION	MAN-DAYS EXPENDED									
	TOTAL PROJECT MAN-DAYS	SENIOR SME REVIEW		IP REVIEW		SMALL-SCALE TRYOUT		REVISION SPECIFI-CATION WRITING		TOTAL MAN-DAY % USED
		MD	%	MD	%	MD	%	MD	%	
Navy										
ISD Team Leader	165	0	0	0	0	0	0	0	0	10
Pilot SME & Sr SME	391.5	97.9	25	0	0	0	0	0	0	25
AW SME & Sr SME	873.4	218.4	25	0	0	0	0	0	0	25
Contractor - On-site										
Project Director	245	0	0	24.5	10	0	0	0	0	10
IT	700	0	0	0	0	84	12	91	13	25
Secretarial	256	0	0	51.2	20	0	0	0	0	20
Production	2458	0	0	0	0	0	0	0	0	0
Contractor - Off-site										
Managerial	99	0	0	9.9	10	0	0	9.9	10	20
Secretarial	224	0	0	22.4	10	0	0	22.4	10	20
Production	191	0	0	0	0	0	0	0	0	0
IP	146	0	0	21.9	15	0	0	0	0	15

Lack of SME time availability. Because SME time was taken up mainly with authoring activities, it was difficult in many cases for them to find sufficient time to make a careful review of the instructional materials as they were evolving. Very often, because the senior SME had more work than he could handle, other SMEs had to be designated as reviewers. As large amounts of materials were written and needed careful review, this review process very quickly became a bottleneck. The review process, though it sounds quite simple, can in many cases require rewriting of instructional materials or lengthy deliverations on fine points of technical doctrine. A careful review very often takes as much time as authoring, and the time for reviews cannot be short-circuited without causing problems. In the future, this problem can be solved by budgeting realistic amounts of time for reviewing instructional materials once they have been produced, and requiring more adequate levels of subject matter expert support.

Impending deadlines in the face of large amounts of untried-out material. In the latter parts of production, large numbers of instructional segments were being produced concurrently. At the same time, it was becoming difficult to obtain adequate numbers of naive students with which to conduct tryouts. As time ran short, it became apparent that there would not be time to conduct a complete tryout of each segment with naive students. An investigation of the tryout data indicated that certain formats of instruction which had been regularized and tried out many times tended to give similar, if not identical, results. The solution to this problem was to adopt a technical review procedure in which instructional formats which had proven themselves were reviewed for technical correctness by the SMEs and were not tried out on an individual basis. It was not felt that this fallback position for the individual tryout was detrimental to the quality of the instructional materials, and the full-scale tryout demonstrated that this was indeed the case.

FORMATIVE EVALUATION PLANNING

Activities. The planning of the formative evaluation consisted of the planning of two major phases of quality control: the materials tryout described in a previous section of this report, and the program evaluation, scheduled to take place during the implementation of the training system. That implementation is described in a later section of this report. Planning of an evaluation prior to its execution is essentially as a check against the possibility that information-bearing data might be lost through inadvertance, disorganization, or improperly defined evaluation aims.

The first step in planning the formative evaluation was to state the questions which would guide and focus the evaluation. These questions were written to help define the types of data to

be gathered and the procedures set up to gather the data. Questions were framed concerning student mastery of the content, student attitude toward the instructional materials, technical correctness of the instructional materials, and effectiveness of the implementation plan and management practices.

Next, the stages of evaluation were defined. Three stages were designated for the purposes of the SH-2F project. Stage One of evaluation was designated as a review process which would take place during the development of instructional materials and prior to their being put into useable form. Reviews were designated to be conducted by both instructional psychologists and SMEs, with the psychologist review being concerned mainly with instructional format and the SME review being concerned mainly with the technical correctness of the content. The second stage of evaluation was designated as the small-scale tryout. Small-scale tryouts were to take place following the production of the instructional materials in useable form. The audience of small-scale tryouts was specified as typical students possessing similar qualifications and background as students who would use the instruction.

The procedures used in small-scale tryouts consisted of six main steps. The first was the introduction of the purpose of the tryout and an explanation of session format. Second, a presentation was made of the instructional materials to be tried out. Third, a mastery test was completed by the student. Fourth, an attitude questionnaire was completed by the student. Fifth, the student marked the instructional materials at points containing incorrect or poorly conveyed information. The sixth step in the small-scale tryout was a discussion between the student subject and the instructional design technician conducting the evaluation. The purpose of this discussion was to provide an opportunity for the student to voice opinions or reactions to the materials not adequately expressed in the previous steps of the tryout. Experience showed that it was this final portion of the small-scale tryout which provided the most interesting and useful feedback for the developers and for the revision process.

The third stage of formative evaluation was defined as the large-scale tryout or program evaluation scheduled to take place as the materials were implemented in regular use. Large-scale tryout called for the use of both direct and indirect data-gathering instruments to collect information on both the instructional materials and the management and implementation system through which they were administered. Direct data-gathering tools consisted of mastery tests (both academic and performance varieties), attitude questionnaires, student interviews student note mechanisms, and student marking of instructional materials. Indirect data-gathering tools consisted of instructor interviews and examinations of the mastery and attitude data for entire student groups.

The Formative Evaluation Plan contained the instructions, procedures, and sample data-gathering and summary forms for all three of the above stages of evaluation and was delivered as a report required under the contract under the title "SH-2F Aircrew Training Project Formative Evaluation Plan."

Personnel requirements. The personnel requirements for formative evaluation planning are reported in Table 24.

Training. Since the formative evaluation planning was conducted entirely by contractor personnel, no training was required for ISD team members other than the informal training which took place as the plan was discussed during its evolution and during its use.

Problems and solutions. No problems were encountered during formative evaluation planning or plan writing.

IMPLEMENTATION PLANNING.

Activities. The activity during implementation planning consisted of drawing together into one plan a set of procedures to optimize the smooth instructing and recordkeeping functions of the training system while minimizing the drain on resources. It was during the implementation planning that the practicalities of the real-world training setting interfaced most directly with the theorectical principles of ISD that are derived from research and learning theory.

The implementation plan was produced for use by East and West Coast ISD teams. It was intended to direct their efforts in allocating resources of time, money, personnel, and equipment in the running of the SH-2F instructional system. As expected, the plan was not perfect in its original form. Any plan designed to allocate and manage resources for a newly created system should be expected to require tryout, updating, and revision to make it fully practical and efficient. Such revisions were expected. At the same time, there was an attempt to balance that expectation with an attitude of caution to insure that no changes to the system were made without the consent of the entire SH-2F training community, without sufficient evidence to indicate that a change was, in fact, necessary, and without adequate consultation with educational specialists to determine that the changes did not nullify any of the important instructional properties of the system.

Especially important to implementation planning were the definition of the instructor role and the role of the ISD team in implementing and maintaining the instructional system after contractor support was withdrawn. Tasks identified for the ISD team through task analysis are presented in Figure 15 below.

TABLE 24. MANPOWER REQUIREMENTS CURING FORMATIVE EVALUATION PLANNING

PERSONNEL CLASSIFICATION	TOTAL MAN-DAYS	MAN-DAYS USED IN FORMATIVE EVALUATION	TOTAL MAN-DAY % USED
<u>Navy</u>			
ISD Team Leader	165	0	0%
Pilot SME & Sr SME	391.5	0	0%
AW SME & Sr SME	873.4	0	0%
<u>Contractor</u> - On-site			
Project Director	245	49	20%
IT	700	0	0%
Secretarial	256	26	10%
Production	245	0	0%
<u>Contractor</u> - Off-site			
Managerial	99	15	15%
Secretarial	224	44.8	20%
Production	191	28.7	15%
IP	146	29	20%

AD-A058 793 COURSEWARE INC SAN DIEGO CALIF F/G 5/9
SH-2F LAMPS INSTRUCTIONAL SYSTEMS DEVELOPMENT. PHASE II.(U)
MAR 78 A S GIBBONS, J P HYMES N61339-76-C-0055
UNCLASSIFIED NAVTRAEQUIPC-76-C-0055-1 NL

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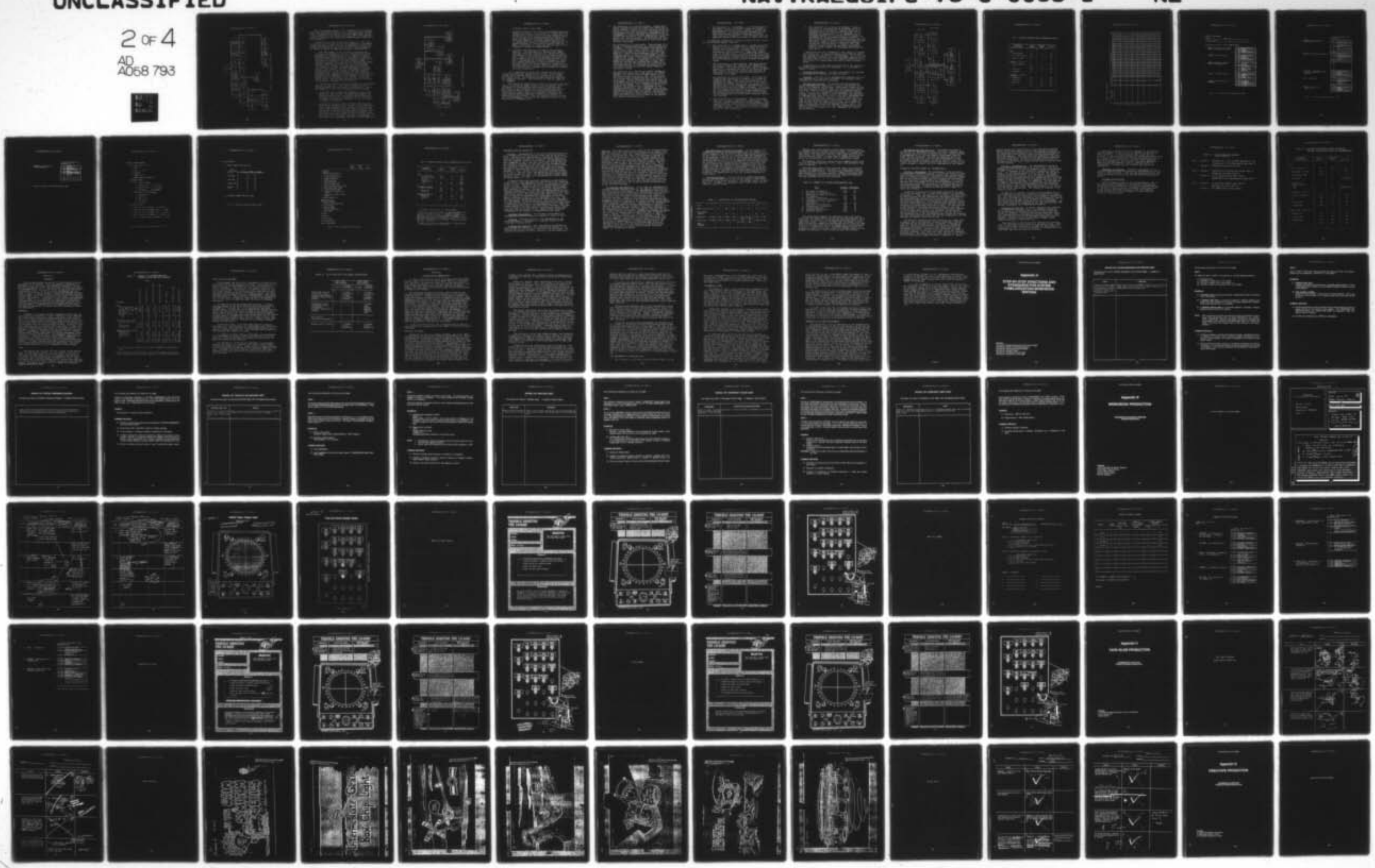

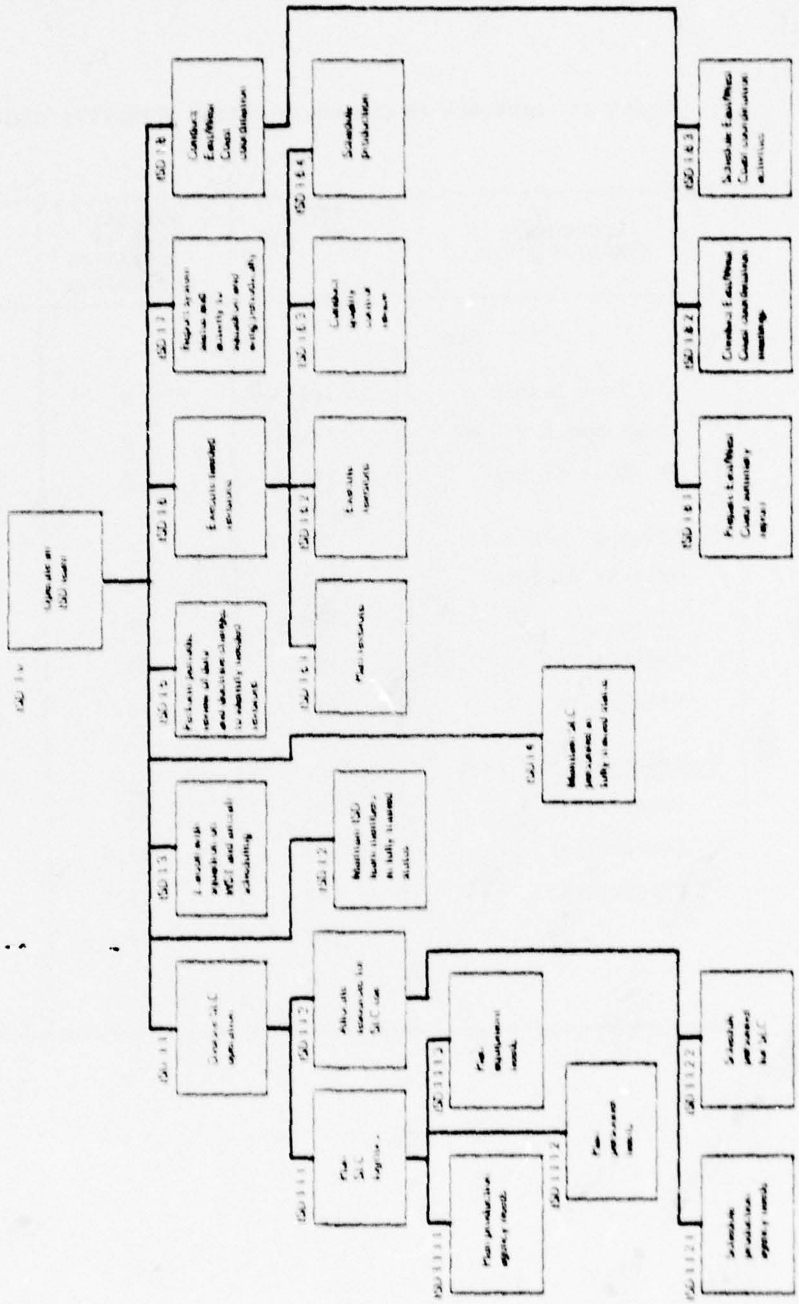

Figure 15. SH-2F ISD Team Operation Task Analysis

The ISD team was assumed to be responsible for directing, modifying, and stabilizing the SH-2F training system. General areas of responsibility include both the organization and day-to-day operation of the Student Learning Center (SLC) and the external relations with cooperating squadrons and production resource agencies.

Instructor tasks are presented in Figure 16. The traditional role of the instructor has been redefined by the advent of instructional systems. The SH-2F implementation plan contained a description of the instructor role and rationale for it, which is considered important enough to reproduce here.

> "The improvement of instructional technology has required a re-examination of roles traditionally held by personnel in training situations. A number of factors have encouraged the adoption of the stand-up instructor lecture as the primary medium for delivery of instruction. Such factors include ease of indoctrination, high instructor availability, and lack of other well-developed options. However, the instructor role of delivering information to students as a group has been realized as a convenience to the training organization, but not always to the student. In fact, the demands on student time and motivation and instructor time have proven to be uneconomical. As the technology of instruction has developed, many commonly accepted instructor functions are delegated to the implements of technology in a way that better satisfies the needs of the student. Such innovation leaves time for improving the instructor role and taking greater advantage of its potential.
>
> "If there has been a restricted review of the instructor function in the past, it has been in perceiving the instructor mainly as a deliverer of information. Some of the drawbacks to this way of thinking are given below:
>
> a. Instructor time is expensive compared to other information delivery systems. Because technology has devised inexpensive ways for delivering information in lectures, particularly instructors who are required to rewrite lesson plans frequently, is not an inexpensive mode of instruction.
>
> b. Instructors can effectively fill many functions commonly given second priority because of the complexities of and time consumed by the information delivery function. These forgotten functions use instructor time and energy in more precise and sophisticated ways that are likely to produce better effects on students and avoid the repetitive, needless task of lecture delivery. These instructor functions come under two headings--host functions and manager functions--and are described

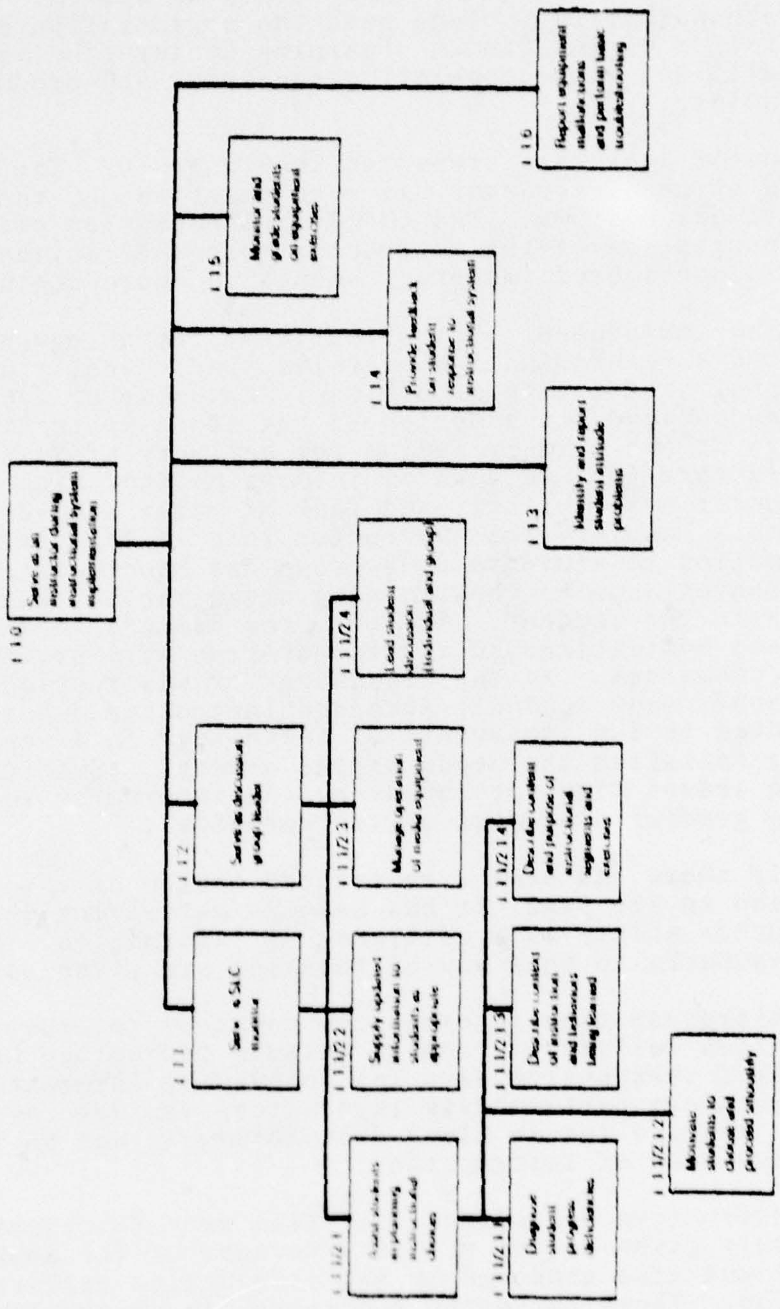

Figure 16. SH-2F Instructor Task Analysis

in detail later in this plan.

c. Instructor presentations tend to be variable within and between instructors. From lecture to lecture and from instructor to instructor even the best lesson plan cannot be counted on to produce instructor lectures which cover the same material without omissions and with consistent emphasis. Problems encountered with new or incompletely prepared instructors, compounded by the natural tendency of instructors to digress and vary make it unrealistic to expect the desired level of consistency in instructor presentations.

d. Instructor presentations are usually not strategy specific. The improvement of instructional technology has identified strategies for instruction which are specific to the behavior to be created in the student. There is no provision presently for using specific strategies during instructor presentations in the Navy. Instructor use of specific strategies is feasible, though troublesome to the instructor, and their use will require the establishment of a broad base of attitudes and skills within instructor personnel before it is practical to implement such a method of strategy-specific instruction.

"It is important to define more clearly the role of the instructor during the implementation of SH-2F instructional systems and to upgrade the duties of instructors to a higher, more useful level. The proposed upgraded instructor functions fall under two headings. The instructor is seen as a <u>host</u> and as a <u>manager</u>.

"The instructor <u>host</u> function gives the instructor the opportunity to provide the human element in the classroom. One of the dangers in indiscriminate application of instructional technology is the dehumanization of the instructional process. Many early attempts to apply instructional technology have eliminated to a great extent the traditional instructor functions without planning anything to replace the elements of human contact and interest. The host function gives an instructor four assignments for which he can prepare in order to avoid the problem of dehumanization:

a. The instructor is an interest-builder. Lessons which convey information alone are usually not sufficient to give a student a conception of the rationale and motive behind it. Very often instructors can present convincing arguments for the importance of learning bodies of information by telling personal experiences, by quoting current data and facts, and by surveying the subject matter with a broad overview. An instructor can build interest in the instruction which is to be later delivered by other means.

b. The instructor as a stage-setter. Instructional technology is becoming much better at achieving precision of effect. Instructional developers have learned to specify goals clearly and in detail. The ability to construct well-made instruction to teach a desired behavior is more and more becoming a reality. Very often the results of precision development include a fragmentation of the subject matter which can be confusing to the student. The instructor's role as a stage-setter becomes very important in this respect. Before an instructional presentation is made, the instructor can set the stage for the instruction and place the behavior to be learned in perspective for the student so that he sees the overall trend his learning is taking.

c. The instructor as a supplier of current information. Mediated instruction has a high initial cost which becomes a low overall cost as large numbers of students use it over a period of time. It is conceivable that mediated presentations may be usable for 5 to 10 years. Within that period new facts, data, and developments may occur which do not justify rewriting of scripts but which are of technical or motivational value to the student. This information may be presented by the instructor as a supplement to the mediated presentation. Such supplements may include information on new weapons or systems, new performance data, or projections into the future. Instructors should be expected to keep current with such developments and report them to the student in his capacity as a current information-giver.

d. The instructor is a respondent. It is not possible to anticipate all the information students will want to know during instruction and to include it in mediated presentations. Following mediated presentations students often request further information or request clarification or explanation. The instructor fills an important function when he responds to these questions.

"A mediated instructional system also gives to the instructor the following manager functions:

a. The instructor as a problem-solver. During the presentation of a course, students may encounter problems or require special attention. At these times it is the instructor's responsibility to become a facilitator. Problems may occur in logistics, scheduling, remediation, or in other areas. If instructors are not buried under the details of preparing the revising lesson plans and preparing for lectures, they will be better prepared to act as problem-solvers and help students through the course.

b. The instructor as a media manager. Mediated presentations are inanimate and cannot deliver themselves to the student. For group presentations, the instructor serves as a coordinator and user of the media equipment. When students are working in individualized mode, an instructor is required to supervise and monitor the individual use of media.

c. An instructor as a discussion leader. Very often the viewpoint and information of students is a useful instructional tool. When these are expressed in the framework of comments and directions by an instructor during formal student discussions, good results can be obtained, both in the exchange of information and in the building of positive student attitudes. Discussions are also a good evaluation device, allowing the instructor to determine the extent of student understanding. The instructor should use discussions for both teaching and evaluating, but should avoid taking the podium as a lecturer.

d. The instructor as a record keeper. One of the advantages of a systematic approach to instruction is that it allows careful accounting of student progress. This accounting allows efficient use of student and squadron time and facilities. The instructor's role as a keeper of student records places him in a position of responsibility for this information.

e. The instructor as a provider of feedback. There are many parts of instruction which go beyond the mere presentation of information. Practice exercises on equipment and in the aircraft are necessary for the building of student skill. It is impossible for a mediated presentation to feed back to the student an assessment of his performance in these situations. As the instructor abandons his information-giving function, more of his time is freed for use on more sophisticated and better-sequenced practice exercises and flights. In this way, the instructor is placed at the point where he is most needed and can render the greatest service, where students are developing their most complex skills.

"Instructors are not recommended in this report as a medium for instruction. It should be equally clear from the above that neither are instructors to be abandoned. It is felt that the redefined instructor role described above improves the instructor's ability to relate to the student when he desired it and to help the student where that help is most critically needed."

A task analysis of the functions necessary to the running of the Student Learning Center was conducted. It is included in Figure 17 below.

Personnel Requirements. Personnel requirements for implementation planning are described in Table 25 below.

Training. Since all of the implementation planning functions were carried out by contractor personnel, no training of Navy personnel was conducted for this phase.

Problems and Solutions. One notable problem encountered during implementation planning was a lack of centralized Navy control over emerging and existing instructional systems and the resources required to support them. The need for such an agency will grow in future years as additional air community members (e.g., H-3, P-3, etc.) perform ISD and implement instructional systems. Without this agency to give concurrence and commitment to implementation plans on the part of the Navy, implementations will be one-sided efforts which will in future years require a high level of support and coordination and attention until such time as they can become stable institutions. It is suggested that the Navy adopt an organizational scheme which favors ISD with a centralized resource and manpower control, such as that begun at COMNAVAIRPAC, in such a way that implementation plans can be made in the presence of a Navy commitment for support and maintenance.

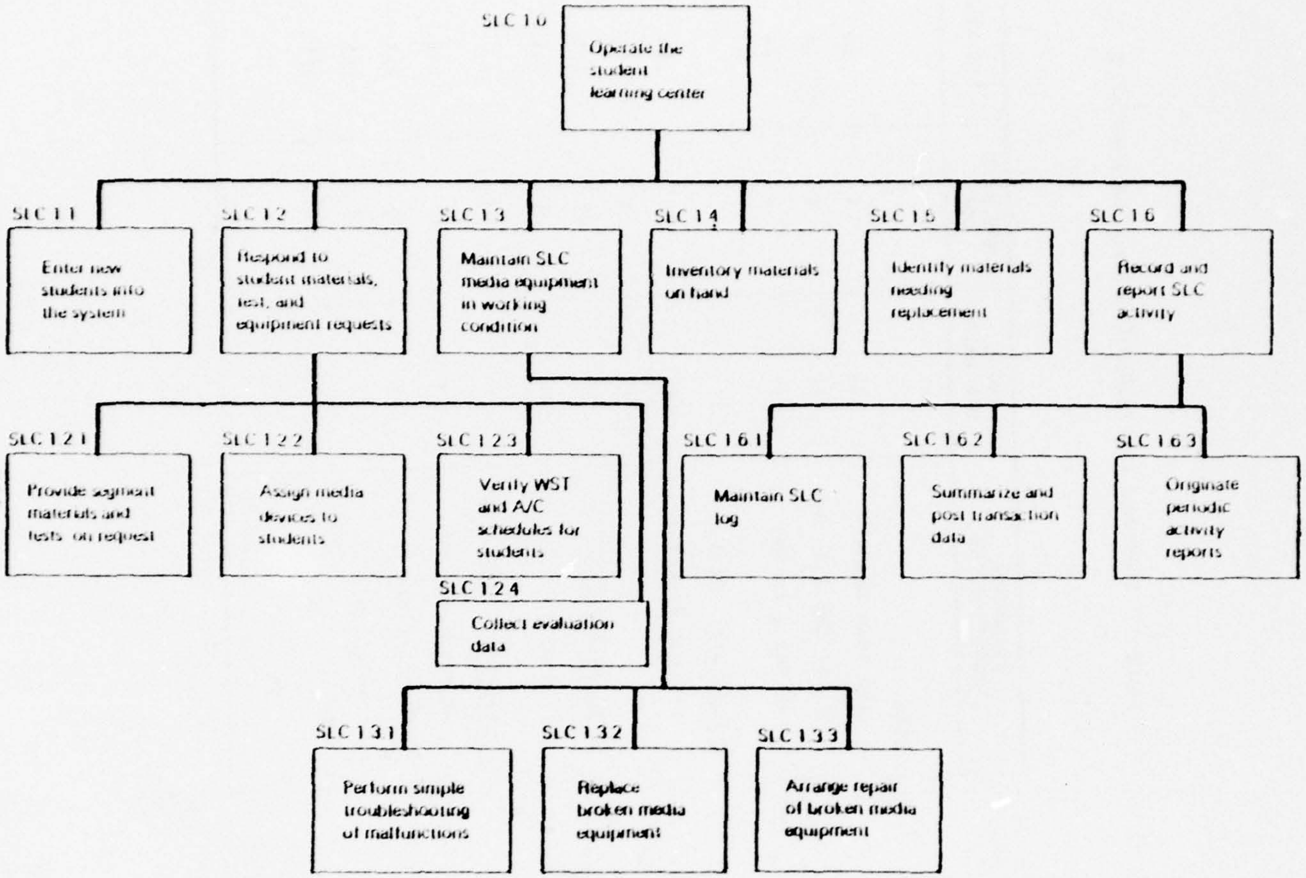

Figure 17. SH-2F SLC Operation Task Analysis

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TABLE 25. MANPOWER REQUIREMENTS DURING IMPLEMENTATION PLANNING

PERSONNEL CLASSIFICATION	TOTAL MAN-DAYS	MAN-DAYS USED	PER CENT
Navy			
ISD Team Leader	165	0	0%
Pilot SME & Sr SME	391.5	0	0%
AW SME & Sr SME	873.4	0	0%
Contractor - On-site			
Project Director	245	49	20%
IT	700	0	0%
Secretarial	256	26	10%
Production	245	0	0%
Contractor - Off-site			
Managerial	99	20	20%
Secretarial	224	56	25%
Production	191	28.7	15%
IP	146	29.2	20%

1.0 STUDENT PERFORMANCE MEASURES

SEGMENT NUMBER AND TITLE	MEDIA	PTS POS	STUDENT SCORES																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Figure 18. Program Evaluation Data Report

2.0 STUDENT ATTITUDE MEASURES

Segment No. ______________ Segment Title ____________________________

Students Reporting ____________ Location ________________________

Place totals in each box to indicate student responses.

1. RELEVANCE: In relation to my job and career, I considered the instruction		a. extremely relevant
		b. relevant
		c. irrelevant
		d. extremely irrelevant
2. ENJOYMENT: The instruction was		a. extremely enjoyable
		b. enjoyable
		c. unenjoyable
		d. extremely unenjoyable
3. AMOUNT: The amount of information covered in this segment was		a. overwhelming in the time allotted
		b. kept me busy
		c. easily completed in time allotted
		d. completed almost immediately
4. INTEREST: The material covered is		a. extremely interesting
		b. interesting
		c. boring
		d. extremely boring
5. CHALLENGE: The instruction in this segment was		a. too demanding
		b. challenging
		c. not really challenging
		d. too simple

Figure 18. Program Evaluation Data Report (CONT.)

( ) Place a check mark in the appropriate box

6. PREFERENCE: If given a choice for future instruction I would		a. like to take more instruction in this form
		b. not like to take any instruction in this form (If b chosen fill in c)
		c. Suggest _________ form for this Instruction
7. QUESTIONS: The instruction allowed for		a. opportunities to get unclear points clarified
		b. not enough opportunities to get unclear points clarified
8. ORGANIZATION: The concepts in the instruction of the material in this lesson were		a. extremely organized
		b. organized
		c. unorganized
		d. completely unorganized
9. TESTS: I found tests		a. covered only the instructional materials
		b. covered material not included in the instruction
10. FEEDBACK: Opportunities for feedback were		a. completely adequate
		b. adequate
		c. inadequate
		d. completely inadequate

Figure 18. Program Evaluation Data Report (CONT.)

( ) Place a check mark in the appropriate box

11. MATERIALS: Audio/Visual aids, workbook formats were

	a. extremely easy to understand
	b. understandable
	c. difficult to understand
	d. completely confusing
	e. If C and/or D, please specify -

Figure 18. Program Evaluation Data Report (CONT.)

5.0 RESOURCE CONSUMPTION SUMMARY

5.0 New Materials Added to Active Use

_____ Workbooks

_____ Tapes _____ Slides

_____ Videotapes

_____ Segments Revised

_____ Segments Added Through Duplication

5.2 Equipment Use Summary

5.2.1 Hours of Use of Equipment

_____ Videotape Players, _____ Total Players

_____ Tape/Slide Carrels, _____ Total Carrels

_____ CAI Terminals, _____ Total Terminals

5.2.2 Hours Unavailable Through Breakdown

_____ Videotape Players

_____ Tape Players

_____ Slide Projectors

_____ CAI Terminals

5.3 Personnel Utilization

_____ Hours of ISD Team Time Expended, _____ Team Members

_____ Hours of SLC Worker Time Expended, (West), _____ Workers

_____ Hours of SLC Worker Time Expended, (East), _____ Workers

_____ Hours of Outside SME Time Expended, _____ Total SME's Used

_____ Hours of Courseware Personnel Time Expended, _____ Persons

Figure 18. Program Evaluation Data Report (CONT.)

4.0 REVISION SUMMARY

____ Number of Segments Requiring Revision

Level of Revision	Technical	Format	Content
Within Page			
Across Page			
Graphics Layout			
Total Re-write			

____ Percentage of Segments Requiring Revisions

Figure 18. Program Evaluation Data Report (CONT.)

	WEST COAST	EAST COAST	NOTES
<u>SLC Operation</u>			
1. Material Issue & Return (LOG)			
2. Test Issue & Return (LOG)			
3. Attitude Questionnaire (LOG)			
4. Equipment Problems (LOG)			
5. Question Banks (LOG)			
6. Equipment Assignment (LOG)			
7. SLC Activity Report (Daily)			
8. Student Group Progress Report (Weekly)			
9. Segment Mastery Report (Weekly)			
10. Attitude Data Report (Weekly)			
11. SLC Inventory & Equipment Status (Weekly)			
12. Student Interview Schedule & Report (Weekly)			
13. Material Request Slips			
<u>Student Personal File</u>			
1. Mastery Test Results			
2. Attitudinal Questionnaire Results			
3. Exercise Results			
4. Instructor Comments			
5. Student Performance Record			
6. Question Banks			
SLC Worker			
SLC Monitors			
E/W Data Delivery			
ISD Personnel Meetings			
Weekly Student Meetings			

Figure 19. SH-2F Implementation Status Report

TABLE 26. MANPOWER REQUIREMENTS DURING IMPLEMENTATION AND EVALUATION*

PERSONNEL CLASSIFICATION	TOTAL MAN-DAYS	MAN-DAYS USED	PER CENT
Navy			
ISD Team Leader	165	99	60%
Pilot SME & Sr SME	391.5	0	0%
AW SME & Sr SME	873.4	0	0%
SLC Staff	79	79	100%
Instructors			
--Monitor at SLC			100%
--WST	**	**	100%
--AC	***	***	100%
Contractor - On-site			
Project Director	245	24	10%
IT	700	70	10%
Secretarial	256	26	10%
Production	2458	0	0%
Contractor - Off-site			
Managerial	99	20	20%
Secretarial	224	44.8	20%
Production	191	0	0%
IP	146	21.9	15%

* Assumption: East and West Coast figures combined

** West Coast Pilot WST Instructors: 3 combination academic monitors and WST instructors plus 2 full-time WST instructors.
East Coast Pilot WST Instructors: 5 combination academic monitors and WST instructors plus 1 department head and instructor.
West Coast Sensor Operator WST Instructors: 2 combination academic and WST instructors plus A/C instructors to fill.
East Coast Sensor Operator WST Instructors: 7 combination academic, WST, and A/C instructors.

*** Number of A/C instructor man-days unknown. System functioned with normal complement of A/C instructors.

IMPLEMENTATION AND EVALUATION

Activity. Implementation of the SH-2F training system took place at two sites, one on the East Coast and one on the West Coast. The West Coast implementation site was at Naval Air Station, North Island, at HSL-31. On the East Coast, HSL-30 was the host squadron located at NAS Norfolk. The implementations were staggered in such a way that would allow the ISD team and the contractor personnel to take part in both implementations. The Instructor Training Course, described later in this report, was presented to both East and West Coast instructor groups. The date of the West Coast course was November 29 and 30 and December 1, 1976. The East Coast course was presented January 11-13, 1977. The West Coast implementation of the Pilot Course was begun December 20, 1976. The Sensor Operator Course began January 5, 1977. The East Coast implementation of both courses was begun January 17, 1977.

A progress reporting system was initiated to issue reports on the status of the implementation and the revisions resulting. Samples of those implementation reports are presented in Figures 18 and 19 below. Figure 18 contains a Program Evaluation Data Report, devised to report details of day-to-day and by-segment data collected for mastery, average attitudinal response, and resource consumption. The data from the implementation was not forwarded in a form that would allow the completion of the first page of this report, but subsequent pages were filled out. Figure 19 contains an Implementation Status Report which gives a general procedural profile of each implementation site. The questions on the implementation status report arise from specific requirements in the implementation plan and are intended to indicate how well the plan is functioning and how well the system is functioning according to the implementation plan. Under the columns headed "East Coast" and "West Coast" the words "yes" and "no" were used to indicate whether each provision of the implementation plan was being utilized. Under "Notes" additional information on the methods of implementation were given.

Personnel Requirements. The personnel requirements for implementing the SH-2F system are reported in Table 26 below.

Training. Training relative to the implementation and evaluation phase is described in a separate section on the Instructor Training Course.

Problems and Solutions. Most implementation problems centered around the newness of the system and the newness of job descriptions for the personnel required to run the system. The problems encountered, and their solutions, are described below.

Training. While much attention was given to the training requirements for pilot and sensor operators because of the complex tasks they are required to carry out, comparatively little attenion in the form of resources was given to the problem of training requirements for instructors. This was true even though the instructor position is one requiring many complex behaviors and decisions for which the job-holders must be trained. Moreover, instructors come to their jobs less trained in basics than the helicopter pilot students come trained for their jobs. Those parts of the instructor training course which were inadequate became apparent during implementation, when instructors found it difficult to perform various of their responsibilities because they did not know what to do. The ISD team should be careful to identify and catalog weak areas of instructor training course and work in a steady fashion over a period of time to revise and supplement the present course in the same fashion they are revising the pilot training materials themselves. This need will be even greater in light of the fact that the instructor training course not only was not given the same time and resources as the pilot training materials, but it was not tried out and revised as was the pilot training.

Non-standard Implementation. To say that the implementation plan was the only necessary plan for the adequate functioning of the SH-2F system is misleading. The implementation plan was the main structure of duties required of ISD personnel and instructors which would allow the instructional materials and exercises to function in a way that would systematically bring students to criterion behavior. Added to this implementation plan, it was necessary for Navy personnel to add their own understanding and management expertise required in the normal running of any administrative function or organization. Coupled with the implementation plan, managerial expertise allowed implementation to proceed smoothly and permitted the instructional system to function in a way that produced competent students. When either adherence to the management plan or the lack of managerial expertise was evident, the system did not function optimally and student performance and attitude as demonstrated by reports and time to completion began to slacken. Adherence to a central plan is a sign of health in any organization, and it is no different in the SH-2F training community. Care should be exercised for however long the SH-2F training materials are used to ensure that the training system is implemented in a standard way according to the implementation plan. Mention has also been made in earlier sections of this report of the importance of maintaining the implementation plan in a current status through review and update in a formalized procedure.

East/West Coast Syllabus Differences. In the course of implementation planning, it became evident that the syllabi, or course sequences, for the East and West Coasts would be different. The main factor in the decision centered upon the organization of the squadrons and their use of certain aircraft and WST scheduling procedures. HSL-30 on the East Coast had the practice of scheduling WST flights in a block separate from aircraft flights. The purpose of this scheduling practice was to facilitate maintenance planning and scheduling and to regularize the flow of students through the training system and ensure that it would happen with the least amount of wasted time. It was found that it was possible to accommodate both coasts with syllabi which differed slightly from each other without destroying any of the principles of sequencing built into the syllabus produced for either coast.

Evaluation Results. The collection of student performance data was accomplished for a total of two classes of West Coast pilots and two of sensor operators. On the East Coast, the same was true. A summary of information about these classes is presented in Table 27 below.

TABLE 27. DESCRIPTION OF IMPLEMENTATION CLASSES

Coast	E	E	E	E	W	W	W	W
Name of Class	RP-1	RP-2	RAC-1	RAC-2	H-3	H-4	S-1	S-2/3
Pilot/Sensor Operator	P	P	SO	SO	P	P	SO	SO
Begin Date	14 Mar	9 May	14 May	9 May	7 Feb 3 June	14 Mar 11 July	20 Dec	7 Mar
Finish Date	18 May	13 July	18 May	13 July	to 28 July	to 1 Aug	15 Apr	29 July
Number of Students					5	5	6	7

Mastery test scores remained surprisingly consistent across all segments for both the East and West Coasts. The student mean test score varied only three points, from 98 to 95, during the test period. At one point, the tests were moved from the lesson level to the unit level. At that time, a change in the test scores was anticipated, but there was no significant change.

The students' mean test scores over all segments tested were: Pilot 95.3%, Sensor Operators 97.6%. This is an acceptably high level of mastery.

Attitude questionnaire data from both coasts was collected. The data was summarized as "favorable" or "unfavorable" and is reported in Table 28 below. The percentages reported are based upon responses to 1483 questionnaires. Student interviews were used to supplement questionnaire data and supported essentially the same findings that are reported below.

TABLE 28. SUMMARY OF ATTITUDE QUESTIONNAIRE DATA

	TOPIC	FAVORABLE	UNFAVORABLE
1.	Relevance of Material	100%	0%
2.	Enjoyment of Instruction	92%	8%
3.	Amount of Information Covered per Segment	66%	34%
4.	Interest of Material	91%	9%
5.	Challenge Posed by the Material	43%	57%
6.	Preference for this Type of Instruction	94%	6%
7.	Questions Clarification	92%	8%
8.	Organization of Materials	98%	2%
9.	Testing Materials	99%	1%
10.	Feedback Opportunities	93%	7%
11.	Material Clarity	100%	0%

The unfavorable responses on questions 3 and 5 are indications that the segmenting of instruction into presentations which took only 5-10 minutes of study time may have been close to the undesirable range. Students responded that the amount of information covered per segment was appropriate but too short for some. They also responded that the short segments were not challenging to most at a comfortable level. Balanced against those is the response to question 6 in which nearly all students preferred the present instruction to other instruction they had received.

Government-Furnished Resources. Government-furnished resources for the implementation phase consisted of Student Learning Centers set up at each implementation site. Media equipment as recommended by the Training Support Requirements Analysis (TSRA) was also procured. The TSRA was generated during the first phase of the SH-2F training system development. Other government-furnished resources include an office at NAS, North Island, and office furnishings which were used by contractor personnel assigned to monitor the SH-2F implementation and support it.

INSTRUCTOR TRAINING COURSE AND IMPLEMENTATION

Activity - Development. The development of the instructor training course should be expected to follow the series of steps and procedures outlined in the ISD process since ISD principles apply to training in general, regardless of the specific content. For the SH-2F project funds were not available for the development of instructor training materials, comparable to the funds available for development of pilot and AW training, so each of the processes in the ISD cycle had to be applied within a constricted environment. Notwithstanding, an attempt was made to follow the ISD model as closely as possible and to apply its logic and procedures.

Instructor Training Course development began with the analysis of the instructor job. A copy of the analysis is presented in Appendix G. Since the scope of the instructor training course was also training for ISD team members and eventually training for preparation and revision of the instructional materials, analyses were completed for those functions and included in the instructor task analysis. The instructor task analysis reflects not only with-student duties but duties during revisions and reauthoring of instructional materials as well. Two main portions of the Instructor Training Course were defined by this dual responsibility: the instructor portions of the course intended to train with-student skills, and the author portion of the course intended to train authoring skills. Not all skills on the authoring side of the task analysis were chosen for training, and that course centered around the writing of materials, not the processes of analysis prior to writing.

The analyses conducted were not carried out to a high level of detail, but it was possible to derive sufficient structure from them for the training course to proceed. Following job analysis, objectives were derived from the tasks identified. Following the derivation of objectives, media selection and sequencing took place. Because of the limitations of budget, the media selected for use were those most easily and least expensively produced. This consisted almost entirely of workbook presentations. Sequencing took place and resulted in the Instructor Training Course syllabus presented in Appendix H. Lesson

specifications were then written for the Instructor Training Course, which were turned directly into authored instruction. The lesson spec used prescribed only instructional strategy and the generality to be covered, along with the prescription for helps and examples. The instruction was authored by contractor personnel and produced through the contractor media production facility at San Diego. No tryout cycle was possible for the Instructor Training Course because of the lack of time and funds for that purpose.

Activity - Implementation. The implementation of the Instructor Training Course took place at two sites. The first implementation of the course was November 29 and 30 and December 1, 1976. A schedule of the training is presented in Table 29 below. The training presented at this time was the instructor training course portion (Part I) of the course. The author training course to be used by those revising instructional materials was not presented pending the identification of ISD team members in need of training. It is expected this will occur on a change of ISD team personnel or leadership. The ISD team and SLC monitor training were also presented with the Instructor Training Course. The second implementation of the Instructor Training Course (Part I only) took place January 11, 12, and 13, 1977, at HSL-30, NAS Norfolk. The schedule of training is presented in Table 29.

In addition to classroom training, on-site support for establishing the instructional system was provided by the contactor. One instructional technologist was assigned to support the East Coast ISD group for one week on site following the training. Periodic visits and phone calls extended the availability of this person even further following his on-site involvement. The West Coast ISD team was supported by the same instructional technologist throughout their implementation period.

Evaluation of the ITC. No formal evaluation was conducted of the Instructor Training Course. An informal evaluation was conducted by contacting participants on both coasts and asking for feedback. Those portions of the course which were well-received were the procedurally-oriented portions. "Nuts and bolts" descriptions of the procedures were well-liked for segments intended to teach students how to conduct brief/debrief interviews, discussions, etc.

Those portions of the course which were not well received were all those portions not written in procedural terms. Some areas of the verbal presentation included too much scholastic background and dealt with the intricacies of instructional strategy where that was not entirely necessary.

There was a recognition also by students of the need for numerous examples in the instruction and the desirability of having practice. It became apparent that it was not only necessary to describe the procedures for conducting certain types of sessions, but to demonstrate portions of actual sessions as well--both typical and atypical. Had the course been developed in the presence of more funding, this would definitely have been the mode adopted, since it coincides with the instructional strategy practices normally followed by the contractor.

Personnel requirements. Personnel requirements for instructor training course development and implementation are presented in Table 30 below. Time reported includes both the time spent presenting the course and the time spent developing the course.

Problems and Solutions.

Lack of adequate resources for ITC development. One of the problems which hampered the development of an adequate instructor training course was the level of resources devoted to instructor training course development as mentioned above. In the future, additional resources, time, and expertise should be devoted to the development of a more extensive instructor training course.

TABLE 29. SH-2F INSTRUCTOR TRAINING COURSE SCHEDULE

Day 1:	Period 1:	Introduction to the Systems Approach to ISD
		Introduction to the Training System (Unit 1)
	Period 2:	Student Learning Center Tour
Day 2:	Period 1:	Operation of the Materials System (Unit 3)
		Conducting Training (Unit 4)
	Period 2:	TICCIT Demonstration (West Coast)
		RANDAX Materials Demonstration (East Coast)
Day 3:	Period 1:	Interpreting Student Data (Unit 5)
		Materials Revision (Unit 6)
	Period 2:	WST Demonstration (West Coast)

TABLE 30. MANPOWER REQUIREMENTS DURING INSTRUCTOR TRAINING COURSE DEVELOPMENT AND IMPLEMENTATION

PERSONNEL CLASSIFICATION	TOTAL MAN-DAYS	MAN-DAYS USED	PER CENT
Navy			
ISD Team Leader	165	16.5	10%
Pilot SME & Sr SME	391.5	0	0%
AW SME & Sr SME	873.4	0	0%
SLC Staff		6	Less than 1%
Instructors Monitor at SLC --WST --AC		90	Indeterminate
Contractor - On-site			
Project Director	245	24.5	10%
IT	700	0	0%
Secretarial	256	51	20%
Production	2458	0	0%
Contractor - Off-site			
Managerial	99	25	25%
Secretarial	224	45	20%
Production	191	134	70%
IP	146	44	30%

SECTION IV

RESOURCES

This section presents an account of the resources used during the SH-2F ISD project. There are separate categories for personnel, time, facilities, and equipment resources. The purpose of this section is to display the type of data being sought by NAVTRAEQUIPCEN as part of the effort to establish the resource requirements of ISD. The SH-2F project implemented the full range of ISD processes to produce a totally implemented instructional system. It should be kept in mind that the data presented in this report should be interpreted in the light of the reports of other ISD projects. Acceptance of SH-2F project was conducted under a unique set of circumstances using a unique ISD model by a unique group of contractor and user personnel, and does not represent an average of accumulated experience gathered in varying environments. Comparing the SH-2F experience with others will begin to establish a reliable basis for planning in future ISD applications.

PERSONNEL

A summary of personnel man-days expended on the project by the principal contributors is shown in Table 31 below. Man-days are broken down by personnel category and phase of the project. Most of the reported data represent detailed records of day-to-day activity during project execution. Some portions of the data (particularly Navy hours during implementation) are estimations of time spent since no actual account was kept. As well as reporting contractor on-site personnel man-days, Table 31 shows total project-related man-days contributed to the project by off-site personnel. Off-site personnel hours are divided into four categories: management, secretarial, production, and IP. Management man-days include time spent for contract management, organization of contract deliverables, and management monitoring of the project. Secretarial hours include typing, composing, and secretarial assistance to contract and project management. Production hours include graphic support of contract deliverable products. IP hours include consulting assistance with training and document preparation and technical monitoring. The table also includes man-days, by task, expended by Navy personnel.

TIME

The elapsed time for each ISD step is given in the phasing chart for the project (Figure 6 of this report). The actual time spent for each phase coincides with those times given on the chart, with the exception of the implementation and evaluation phase which actually began on December 20, 1976. There was some delay in the final production of instructional materials in a tryout ready form, which required the delay of the implementation. This delay was due in part to longer than expected authoring and production times.

TABLE 31. SUMMARY OF PERSONNEL MAN-DAYS EXPENDED DURING THE SH-2F PROJECT

CATEGORY	Materials Prod.	Materials Tryout	Formative Eval. Plan	Implementation Plan	Imp. & Eval.	ITC Devel. & Impl.	Total Man-days
	TASK						
Navy							
ISD Team Leader	33	17	0	0	99	17	165
Pilot SME & Sr. SME	293	97	0	0	0	0	391
AW SME & Sr. SME	655	218	0	0	0	0	873
SLC Staff	0	0	0	0	*	*	*
Monitor at SLC --WST --AC	0	0	0	0	**	**	**
Contractor (on-site)							
Project Director	73	25	49	49	24	25	245
IT	455	175	0	0	70	0	700
Secretarial	77	51	26	26	26	51	257
Procution	2458	0	0	0	0	0	2458
Contractor (off-site)							
Managerial	0	20	15	20	20	25	99
Secretarial	0	45	45	56	45	45	224
Production	0	0	29	29	0	134	191
IP	0	22	29	29	22	44	146
	4044	670	193	209	385	437	5749

* See Table 30 for details of man-days expended for instructor time.

** No record was kept on either coast of the amount of aircraft or WST instructor time actually expended in system-related duties.

FACILITIES AND EQUIPMENT

The equipment and facilities requirements for this project on the West Coast were comparatively large. Three large on-site work areas totaling approximately 2000 feet were dedicated to project personnel. One large work area housed the project director, instructional technologists, secretarial help, and subject matter experts. The second major area contained a production staff of paste-up artists and graphic artists. The third production area contained artists, a photographer's work space, and desk facilities for a production instructional technologist and a TV director. Eventually, near the end of the project, a 20 x 20 foot space was made available for use as a darkroom/laboratory.

In addition to the above-mentioned resources, a Student Learning Center was set up on the West Coast consisting of approximately 1500 square feet of air-conditioned and sound-proofed space. To make this space adequate for Student Learning Center use, modifications had to be made in the form of walls added, carpet laid on the floor, and walls painted throughout. In addition to allocating and preparing the space for the Student Learning Center, equipment had to be purchased for use in the Student Learning Center as media devices. Table 32 below names the specific media devices acquired for the Student Learning Centers on both coasts.

On the East Coast, a Learning Center was also prepared, consisting of a sound-proofed, air-conditioned space (approximately 1000 square feet) adequate for housing media devices and a separate storage/checkout area. Much has been done to make this area pleasant and conducive to study.

In addition to these resources furnished by the government, other government-furnished resources are described in earlier portions of this report under the heading of the activity for which the resources were supplied.

For the offices of the project personnel, the government provided all desks, file cabinets, book shelves, and storage cabinets which were necessary. Phone service was made available to project personnel by the contractor obtaining commercial service. Although a military phone was installed in the office, contractor personnel did not use the military phone except on rare occasions.

TABLE 32. SH-2F EAST/WEST COAST MEDIA ACQUISITIONS

	West Coast Requirements		East Coast Requirements	
	Carrels	Extra Equipment	Carrels	Extra Equipment
Tape/Slide Carrles (projector, small screen, tape player, earphone connections, carrel)	8	1 slide projector 2 tape recorder/ players	9	2 slide projectors 3 tape recorder/ players
Videotape Carrels (videotape player, TV monitor, earphone connection, carrel)	1	-------	2	1 video-tape player/ monitor combina-tion
Bare Carrels (no media equipment)	7	------	4	-----
Random Access Carrels	2	1 random access projector	5	3 random access projectors

SECTION V

CONCLUSIONS/RECOMMENDATIONS

For this second half of the SH-2F instructional development project (Phase II), as in the first phase (Phase I) of the project, the basic ISD model was found to be robust and effective in creating instruction of a consistent quality and effect. The steps in the model were conscientiously applied to produce a product which has proven itself practically usable and desirable in terms of its results.

The atmosphere in which the project was carried out had elements which were conducive and nonconducive to the success of an ISD project. The project had sound financial support and sufficient backing at higher levels of command to give it strong momentum and the ability to acquire resources and assistance when unexpected needs arose. At the same time, any new undertaking which seeks to establish a new order of things different from the old way, can expect to encounter some resistance and difficulty in acceptance of the change. The old order in this case was a set of opinions which have existed for decades on how instruction should be prepared, administered, and managed. In light of these forces which were operating, one is constrained to remark how smoothly the project progressed, how flexible the ISD teams and SMEs were when asked to do something new, and how readily the instructional system was accepted and supported by those in charge of administering it. This demonstrated a willingness to innovate characteristics of leadership exercised by many in instituting a new type of instruciton.

It would be well at this time to consider each of the processes which were executed during this phase of the SH-2F project separately.

THE BASIC ISD MODEL

Authoring was the first process executed, and it was demonstrated during authoring that assembly-line production of instruction materials is possible without a decrement in instructional effectiveness. SH-2F subject matter experts wrote the main body of instructional materials following guidelines set down for them by project instructional psychologists. The products of this authoring process were well received by students and in some cases achieved remarkable results in shortening instructional time or increasing instructional effectiveness. It is of great importance to remark that these authors who were producing effective instruction were not specially trained as instructional authors beyond the short training period provided by the contractor, nor were they grounded in psychology of training and instruction. Their ability to write effective instruction points out the validity of the claim made at the outset of this project that the teaming of psychological expertise and subject matter expertise can

be made if the talents and strengths of each are appropriately organized for work and if appropriate and detailed instructions are given.

There are, however, some reservations about this principle which should be stated. First, the writing of instruction was facilitated to the extent that the subject matter expert was basically a good writer. All of the instruction produced by the subject matter experts was passed through an editing process designed to catch typographical errors, incomplete sentences, poor expression, and so forth. It was apparent that the work of some subject matter experts required extensive editing, while the work of other subject matter experts required only touch-up. It also became apparent that the subject matter expertise of subject matter experts varied considerably. The ability to tap subject matter expert ability naturally depends a great deal on how expert the subject matter experts are. The successful welding of psychology and subject matter expert talents requires that each be competent and make decisions within their own realm which are sound and will hold.

The second reservation concerning the assembly-line production of instructional materials in this fashion is the requirement to supply a "creative overlay" to the instructional components. This overlay can be produced by subject matter experts, suggested by them, or supplies by specially trained creative writers. This creative overlay is in some cases beyond the realm of the average subject matter expert, because it requires a high degree of creativity and great skill with working with words and visual presentations. This became most apparent for the SH-2F project in the writing and making of videotapes. Videotape making requires a high degree of creativity and artistic conceptualization, the time and talent for which most subject matter experts simply do not have.

The conclusion is that even though assembly line production of instruction materials by subject matter experts is possible, allowance must be made in staffing patterns for those instructional media which requires creative output for additional time and talent to be applied in sufficient quantities to make that creative overlay.

Production was the second main activity engaged in. The production for the SH-2F instructional materials went well, and it is felt that a reasonably high quality of material was obtained in all media. The main concern in this area was the need for more extensive planning and preparation for the production period than was allowed in the project. It was found through hard experience that the conceptualization of formats and production schemes is not a simple task, especially when working with borrowed resources, personnel, and equipment. For the SH-2F project, those resources came together extremely well and in a timely

fashion, and the contractor found that several agencies with specialized personnel and equipment were willing to cooperate and make those personnel and equipment available to the project at a rate sufficient to complete the production task on time.

Evaluation and implementation planning were phases which the contractor completed almost alone. This was the original plan, and staffing was carried out to support that decision. It turned out that during implementation and evaluation planning several commitments were required from the Navy concerning resource use and allocation and personnel use and allocation which required a greater input from Navy personnel, notably the ISD Team Leader. Had this been planned for at the outset of the project, implementation and evaluation planning would have proceeded more smoothly and a greater portion of the ISD Team Leader's time would have been set aside during these processes. The effect would have been easier-to-make and more realistic plans requiring fewer revisions.

Evaluation and implementation of the instructional system went smoothly despite several opportunities for it to do otherwise. This was due in large part to the energetic efforts of ISD personnel on both coasts who were willing to take responsibility and exercise leadership. Without a successful implementation on both coasts, the time, energy, and money expended in creating instructional material and tests would have been in vain, and it is felt that this crucial stage of the project was very successful.

Instructor Training Course development and implementation was a phase of the project in which more resources were needed, as has been mentioned earlier in this report. The role of the instructor in an instructional system (versus the traditional use of instructors) is so novel and requires so many tasks for which instructors are normally not trained and have no reference of experience, that it deserves an entire training course of substantial duration. The payoffs that could be expected for such a course if properly engineered would be more efficient and better prepared instructors whose efforts could be expected to increase student achievement, decrease the waste of physical resources, and improve the attitudinal and emotional responses of students to their training and probably toward the squadrons and service of which they are a part. It is entirely possible that a generic instructor training course could be constructed if enough air communities were involved in ISD-produced systems which would meet the needs of all of those communities and train the instructors in the skills which are specific to a system produced through ISD.

ISD IMPLEMENTATION CONSIDERATIONS

The statements in the above section indicate that, for the

most part, implementation of the ISD model was successful and occurred as planned. Two general issues concerning the manner in which ISD is implemented did arise, which will require some adjustment in the practice of future ISD projects. These are explained below.

Assignment of SMEs

The largest of these issues concerns the assignment of subject matter experts and the formation of ISD teams within the Navy. The SH-2F project was fortunate in that the people who were assigned to it as subject matter experts were on the whole capable and motivated to do quality work. Other projects which have attempted to apply ISD, notably the EA-6B project, tested the premise that subject matter experts who are paid by the contractor are more effective in their use of time than subject matter experts who are paid by the Navy. The EA-6B project finding was that almost exactly three times as much production came from contractor-paid subject matter experts.

Though this finding is satisfying to those who were responsible for accounting for project monies, it flies in the face of the concept of a subject matter expert team, cooperating with a team of psychologists so that an in-service/out-of-service cooperative bond is formed, giving the subject matter experts pride of authorship in their materials, and relieving the contractor of the burden of producing a product completely foreign and isolated from the day-to-day concerns of the operational environment in which the materials will be used. Too many times in the past, products have been produced by contractors in isolation from this environment and have been introduced into the environment only to find that they do not meet the needs and that that they do not communicate adequately. These products fall into nonuse quickly and amount to an expensive mistake.

On inquiring into the reason for the great divergence in contractor-owned SME production and service-owned SME production, some of the most obvious factors working to effect the difference are auxiliary duties and morale. First, the average subject matter expert is burdened with auxiliary duties within the squadron and the duties of keeping on current flying status to the extent that between 35% and 50% of his time is unavailable for project use. Furthermore, when subject matter experts do arrive for work on project matters, the warm-up time on their tasks and the time normally spent in communicating with other staff workers reduces the subject matter expert's effective working time to less than 50%. Second, morale becomes a factor in light of the fact that ISD team assignments are not currently viewed as being career-enhancing and are not normally given as rewards. On the contrary, they are looked upon by many as assignemnts which are convenient storage places for those who do not suit other more important jobs, whether this is in fact the case or not (and we

do not believe it is). Consequently, when the newness of the job wears off or difficulties are encountered, very often the morale of subject matter experts assigned under this regime lapses and production becomes very low. It is a credit to the SH-2F ISD team that they were able to discredit this common misconception of the subject matter expert and realize the importance of the effort in which they were involved, which stimulated them to produce instructional materials of good quality and at a satisfactory rate.

The solution to the subject matter expert problem described above may take several forms. The contractor hiring of subject matter experts is probably not a satisfactory solution for the reasons described above. An alternative solution would lie in the service. If the ISD team member's job can be made to appear, and in economic and professional fact become, a status assignment for which one must compete and which one must perform well in order to retain, then the productivity and intelligent work of subject matter experts can be expected to increase.

In light of the fact that a peacetime service's efforts are expended to a great extent on the training of service members and that even in wartime tremendous expenditure of time and effort and money is made in training, this suggestion is not altogether foreign to already existing policy and philosophy. Perhaps all that needs to be done is to redefine the economic and professional incentives for those who would become involved in ISD work.

Readiness of the Navy Environment

The second major issue of importance to the implementation of ISD programs within the Navy is the readiness of the Navy environment to accommodate instructional systems produced through ISD. Experience of the past has shown that working through the ISD procedures alone and establishing an instructional system alone do not ensure the success or the permanence of that system. Instructional systems are engineered and procured in much the same fashion that physical weapon systems are procured and engineered, and many of the steps in the production of each are analogous. The survivability of physical weapons systems depends as much on the support and the maintenance provided them in the years after they are placed in service as it does on careful design and execution during production. If the process of producing an instructional system is analogous to the process of producing a physical weapons system, then the process of maintaining the instructional system must also be analogous to the process of maintaining a physical weapons system. Maintenance for a physical weapon system includes periodic servicing, update of system capabilities, periodic renovation, and careful evaluation of the operational effectiveness of the system through testing and data gathering. All of these processes apply to the maintenance of instructional systems as well. They apply even more particularly

to instructional systems, in fact, because an instructional system is an intangible thing -- more difficult to adjust, more difficult to modify, and its effects more difficult to discern, though having an impact perhaps more solid than any weapons is capable of producing.

It is the recommendation of this report that institutions and procedures be set up to guide and support ISD not only during its formative stages but even more importantly during implementation stages and the years of operation that a good instructional system will offer. To support and maintain these systems, to train the personnel who are responsible for administering them, and to coordinate with squadron commanders who are responsible for donating many of the resources and personnel for running them, this agency should be given sufficient command responsibility and status that it can bargain and compete effectively with other operational concerns in producing instructional systems with a high effectiveness level and a high survivability rate.

Appendix A

STEP-BY-STEP DIRECTIONS AND STANDARDS FOR SYSTEM FAMILIARIZATION WORKBOOK WRITING

Contents

WRITING THE "SYSTEM COMPONENTS AND FUNCTION PAGE"

The author will fill out a "System Components and Function Page." A sample is shown below:

PART	FUNCTION
(Name all parts used in diagram. Do not name wires or connecting tubes unless you intend to explain their function. List in an order that traces the signal through the system.)	*(State function briefly but completely. Explain in such a way that as student reads through this column he will have a complete picture of the system operation without jumping around.)*

The following are directions for filling out the page:

STEP 1

To determine what a "PART" or component is, use the following definition:

A component either
(1) originates or alters flow in the system,
(2) controls or directs flow in the system, or
(3) provides a means of monitoring flow in the system.

EXAMPLES

(1) A **hydraulic pump** is a component because it pressurized hydraulic fluid (alters flow in the system).

(2) A **hydraulic relief valve** is a component because it prevents damage to the system from high pressure by siphoning off excess pressure at a predetermined level (controls flow in the system).

(3) A **hydraulic pressure gage** is a component because it provides a pressure reading (monitors flow in the system).

NOTE: Both manipulative controls and indicators should be included as components where appropriate under the labels "CONTROLS" and "INDICATORS," respectively. While all manipulative controls and indicators are also covered on the "CONTROLS AND SWITCHES PAGE" and "INDICATOR PAGE," they should be included here as they impinge on the system generally.

COMMON MISTAKES

(1) A frequent mistake is including components of a larger, more general system. For instance, the hydraulic reservoir definitely shares a relationship with the hydraulic hoist subsystem, but is really a component of the hydraulic power supply system.

(2) The most common mistake, however, is not adding components, but omitting components. This has occurred despite the fact the component was included in the diagram. If any would-be component fits the description given above, it should be included.

STEP 2

Once a "PART" is identified, follow the directions given at the top of the page in describing that component's "FUNCTION" in the system.

EXAMPLES

(1) **Hydraulic relief valve.**
Located downstream of the check valve, it regulates system pressure. It has a cracking pressure of 1750 psi; any fluid passing through this valve is returned to the reservoir.

(2) **Hoist up-down switches.**
Actuate up-down solenoid. There are two electrical switches: one on the pilot's grip, and the other on the operator's grip (pilot's grip has override priority).

COMMON MISTAKES

(1) Controls are defined in terms of specific lever or switch positions instead of overall function of the control in the system. The "CONTROLS AND SWITCHES PAGE" and "INDICATORS PAGE" are designed to deal with specific control positions.

(2) Controls and indicators are omitted as components.

WRITING THE "SYSTEM COMPONENTS DIAGRAM"

The author will fill out a "System Components Diagram." A sample is shown below:

Draw a simple (but complete) schematic drawing showing main components, regulators of importance, control units, sensors, etc. Use boxes or blocks, and where possible use outlines and layouts which approximate actual component shape and layout.

The following are directions for filling out the page:

Include all components described on "SYSTEM COMPONENTS AND FUNCTION PAGE," using the same numbering system. Follow the directions at the top of the page explicitly. Remember that when diagramming subsystems, indicate source and state of input, e.g., "Pressurized fluid from pump."

EXAMPLE

(See example for hydraulic hoist subsystem.)

COMMON MISTAKES

(1) Failing to include components that are described on "SYSTEM COMPONENTS AND FUNCTION PAGE."

(2) Using boxes when component shapes are readily available.

(3) Using illogical or confusing flowchart conventions or techniques.

(4) In case of subsystem, laying out diagram so integrity of system (or macro-system) is ignored. For example, drawing the hydraulic hoist subsystem as though it were independent of the hydraulic system (the hoist subsystem utilizes pressure **from** the hydraulic system, rather than generating its own).

(5) Failing to indicate source and state of input if other than present system.

WRITING THE "CONTROLS AND SWITCHES PAGE"

The author will write a "Controls and Switches Page" with the heading shown below:

CONTROL AND TYPE	EFFECT
(Give name of all system-related controls and types, e.g., 5-position switch, rheostat, lever, etc.).	(State (1) name of position as found on panel, or name of direction of movement, (2) effect of that position or effect of movement.)

The following are directions for filling out the page:

STEP 1

The control name should be taken directly from the functional description section of the "SYSTEM COMPONENTS AND FUNCTION PAGE" entry for "CONTROLS." These should agree with the NATOPS designations.

STEP 2

Describe the type of control as indicated in the directions. If it is a variable position control with more than ON-OFF functions, indicate number of positions as well as type of switch (toggle, rotary, push button). If the switch is spring-loaded, indicate to which position.

EXAMPLES

(1) Rescue hoist switch:
3-position toggle switch spring-loaded to "OFF" position.

(2) Downlock override button:
spring-loaded to "UP" position.

COMMON MISTAKES

(1) Under description.

(2) Lack of agreement with control names listed in "COMPONENTS AND FUNCTION PAGE."

STEP 3

Follow the directions precisely as stated at top of page. List position exactly as it appears on control if applicable. If no printed positions are involved, indicate direction of movement.

If notes and special considerations pertain to the interaction between positions, keep brief and insert as needed.

EXAMPLES

(1) (Landing gear emergency handle)
DOWN —
When placed in down position, the up-lock device is released and the emergency hydraulic valve is actuated permitting any fluid trapped in the actuator to pass into the return line and allow gravity to extend the landing gear.

(2) (Rescue hoist switches)
"OFF" —
Secures electrical power.
"DOWN/UP" —
Energizes appropriate solenoid to drive hoist motor.

NOTE: a. The electrical circuits are arranged so that the pilot's switch will override the hoist operator's switch.
b. Up and lower-limit switches stop the hoist at both extremes of travel.

COMMON MISTAKES

(1) Failure to indicate switch positions or direction of movement.

(2) Tendency to describe function of control or switch as it relates to system, rather specific switch positions.

(3) Failure to list switch positions as they appear on control.

WRITING THE "INDICATOR PAGE"

The author will write an "Indicator Page." A sample is shown below:

INDICATOR (Name all indicators affected by or giving data on this system.)	MEANING (State (1) what indicator states are, e.g., lit or not lit, value scale, etc., and (2) what each state of the indicator means in terms of system operation.)

The following are directions for filling out the page:

STEP 1

The indicators included in the column marked "INDICATOR" should match those described out in the "FUNCTIONS" column of the "SYSTEM COMPONENTS AND FUNCTION PAGE" under "INDICATORS."

STEP 2

To fill out the "MEANING" column, follow explicitly the directions given at the top of the page. Describe units of measurement for all value scales (e.g., psi, Hz, knots, etc.). When describing the meaning of various states for value scales, be sure and cover the meaning of all color-coded or otherwise special designated portions of gauges, dials, etc.

EXAMPLES

(1) Red paint on hoist cable —
Showing — Indicates operator is now unwinding last 15 feet of cable. Under manual control, this is his cue to stop playing out cable.

(2) Landing gear lever light —
Lit — The red light on the landing gear handle will glow whenever the position of the landing gear is not the same as the position of lever, or whenever landing gear is in an unlocked condition.

COMMON MISTAKES

(1) Failure to indicate state.

(2) Tendency to describe physical location of indicator, upstream and downstream components, general effect of indicator on operator actions, etc.

(3) Omitting indicator states, or failing to discriminate between different states.

WRITING THE "COMPONENT FAILURE PAGE"

The author will write a "Component Failure Page." A sample is shown below:

COMPONENT (Name all system components which can fail which have some implication to pilot action.)	EFFECTS OF FAILURE ON SYSTEM (State effect on working of system, e.g., breakdown, etc., and cautions.)

The following are directions for writing this page:

STEP 1

Include all "COMPONENTS" as described in the directions at the top of the page. List only those components whose failure has some implication on pilot action. Keep in mind that while not all components have direct indications of failure such as lights and gauges, they may have indirect indications, i.e., you may not know a particular component has failed until the system itself fails. Automatic compensating features of a system that cannot be monitored by the pilot, and the associated components, are nice-to-know information for this page. That kind of information is best covered on the "SYSTEM COMPONENTS AND FUNCTIONS PAGE."

STEP 2

"EFFECTS OF FAILURE ON SYSTEM" snould be specific and relative to the system you have diagrammed and described. If you find yourself describing effects for components not included in the original description, reevaluate the system or failure you've described, or both. Include all special notes, cautions, and warnings where applicable.

EXAMPLE

(1) Hydraulic relief valve —
Failure of the relief valve can result in damage to the system due to excessive pressure (e.g., ruptured lines and fittings) and eventual failure of the entire system.

(2) Hydraulic cable —
A snapped or otherwise severed cable, or tangled cable, would render the hoist inoperative.

CAUTION: A cable which snaps under load could inadvertently become entangled in the rotor.

COMMON MISTAKES

(1) Inclusion of components and failures that do NOT have some implication to pilot action.

(2) Exclusion of valuable components.

(3) Inclusion of precautions or operating instructions — those are covered elsewhere in course material.

WRITING THE "COMPONENT LIMITS PAGE"

The author will write a "Component Limits Page" with the heading shown below:

COMPONENT	LIMIT
(Name only components which have limits which pilots have need to know.)	(State the limit, e.g., temperature, pressure, stress, and any variations. Possibly state why it is important to know this limit.)

The following are directions for filling out the page:

Follow directions explicitly for both "COMPONENT" and "LIMIT" columns. While every system can be reduced to a mass of limitations in the engineering sense, the pilot has no need for all of this information. Select those limitations that could have an impact on pilot action, and then state them in a concise, accurate manner. If it is not obvious as to the value of a particular limitation, state why it is important to know.

EXAMPLE

(1) Hoist arm — 600 lb. load limit.

(2) Engine torque — 83% single engine.

COMMON MISTAKES

(1) Omitting valuable limitations.

(2) Including nice-to-know or irrelevant information, e.g., initialization or test data.

Appendix B

WORKBOOK PRODUCTION

INTERMEDIATE WORKBOOK VERSIONS DURING PRODUCTION

Contents

INITIAL AUTHORED AND EDITED SEGMENT

PROCEDURE

ILLUSTRATION
(or an idea for an illustration)

SH-2F WITH
BLINDFOLD
GROPING THROUGH
SKY.

EXERCISE:

LESSON: LN-66-HP ~~UN~~ AA

SEGMENT: TROUBLE SHOOTING

MEDIA: WORK BOOK

OBJECTIVE:

STATE THE STEPS TO TROUBLE SHOOT THE LN-66 RADAR SYSTEM.

$\underbrace{\hspace{6em}}_{\text{UN 11 MS+C}}$

TITLE: TROUBLE SHOOTING THE LN-66-HP

GENERALITY

THE STEPS TO TROUBLE SHOOT THE LN-66-HP RADAR ARE:

1. CHECK THE POSITION OF OPERATING CONTROLS AND SWITCHES.
2. CHECK THAT THE CIRCUIT BREAKERS ARE CLOSED
3. CHECK THE CANNON PLUGS.
4. CHECK THE WAVE GUIDE CONNECTIONS.

UN 11M S+C

DOUBLE SPACE

INTRODUCTION: THE LN-66 HP RADAR, AS ANY ELECTRONIC EQUIPMENT, IS SUBJECT TO BREAKDOWN. TO ALLOW THE AW TO OPERATE THE RADAR AT 100% EFFICIENCY AND TO LET THE OPERATOR EVALUATE THE CONDITION OF THE SYSTEM, TROUBLE SHOOTING PROCEDURES HAVE BEEN DEVELOPED. THE SENSOR OPERATOR SHOULD USE THESE STEPS WHEN THE LN-66HP RADAR WILL NOT OPERATE NORMALLY.

UN 11M S+C

A

TITLE: LN-66 TROUBLE SHOOTING
SEGMENT NUMBER: 9 PAGE 1 OF 2

UN 11BC (CAPS)

STEP	PROCEDURE	ACTION PERFORMED	IMPORTANT NOTES AND COMMENTS	ILLUSTRATION DESCRIPTION AND MANUAL REFERENCE
1	CHECK THE POSITION OF THE MAIN CONTROLS AND SWITCHES	USUALLY CHECK THAT THE POWER, TRANSMIT AND SCANNER ARE IN THE UP POSITION. GAIN, TUNE, INTENSITY CONTROLS ~~AS~~ DESIRED.		FIG. 9-3 NA-01-260HCD-1
				BLANK SCOPE WITH TRANSMIT SWITCH OFF AND AW MAD KICKING R-T UNIT.
2	CHECK THAT THE CIRCUIT BREAKERS ARE CLOSED	RESET ALL CIRCUIT BREAKERS: RADAR AC, RADAR DC, LN-66-NORTH STAR	UN 10M S+C	FIG. 1-32 NA-01-260HCD-1
			DIAGRAM	SCOPE WITH SCAN BUT NO CONTACTS WITH A/C CIRCUIT BREAKER OUT.
3.	MAKE SURE ALL CANNON PLUGS ARE SECURE.	TYPE AW WILL CHECK THE 2 CANNON PLUGS ON THE BACK OF THE DISPLAY AND 1 PLUG IN FRONT OF R/T BEHIND THE GUARD, BY MAKING SURE THE PLUGS ARE SCREWED ON TIGHT.	PHOTO	PICTURE OF LOCATION OF CANNON PLUGS ON DISPLAY AND R/T UNIT.
	UN 10M CAPS	C		AW TRYING TO PRODUCE A PICTURE WITH BACK OF DISPLAY VISIBLE TO SHOW CANNON PLUG DISCONNECTED (AW PISSED OFF)

DELETE

TITLE: LN-66 TROUBLE SHOOTING
SEGMENT NUMBER: 9 PAGE 2 OF 2

UN 11BC (CAPS)

STEP	PROCEDURE	ACTION PERFORMED	IMPORTANT NOTES AND COMMENTS	ILLUSTRATION DESCRIPTION AND MANUAL REFERENCE
4	CHECK THE WAVE GUIDE CONNECTIONS.	AW WILL REACH DOWN TO CHECK THE 2 CONNECTIONS AVAILABLE FROM THE FRONT OF R/T BEHIND THE GUARD, FORWARD TO THE DECK PLATE		PICTURE OF WAVE GUIDE LOCATION
		TYPE		AW OPERATING RADAR WITH WAVE GUIDE DISCONNECTED CAUSING RF TO BEAM OUT OF THE FRONT OF R/T.
5	IF THE PRECEDING STEPS ARE NOT EFFECTIVE IN SOLVING THE PROBLEM, ~~THE AW SHOULD NOTE THIS FACT ON THE VIO-MAF~~ NOTE RADAR SYMPTOMS ON THE KNEEBOARD.			H-2 SWEEPING THE SEA FROM HORIZON TO HORIZON WITH RADAR.
	AT THE COMPLETION OF THE FLIGHT, REPORT THE DISCREPANCY ON THE VIDS-MAF CARDS.	ALL OTHER TYPESET IN UN 10M S+C		
	UN 10M CAPS			
	(C)			

Step-1

LN66HP Radar Display Panel

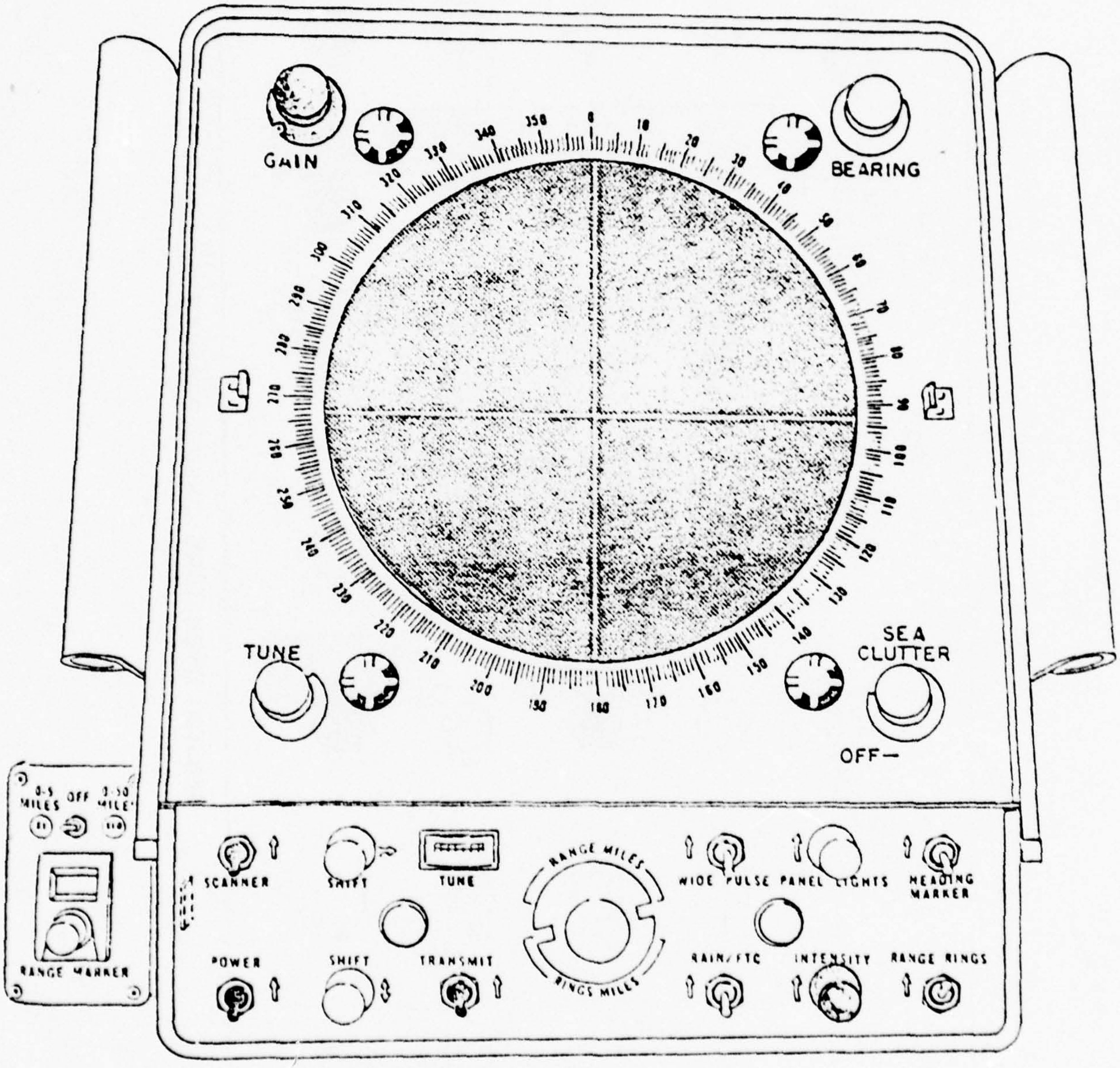
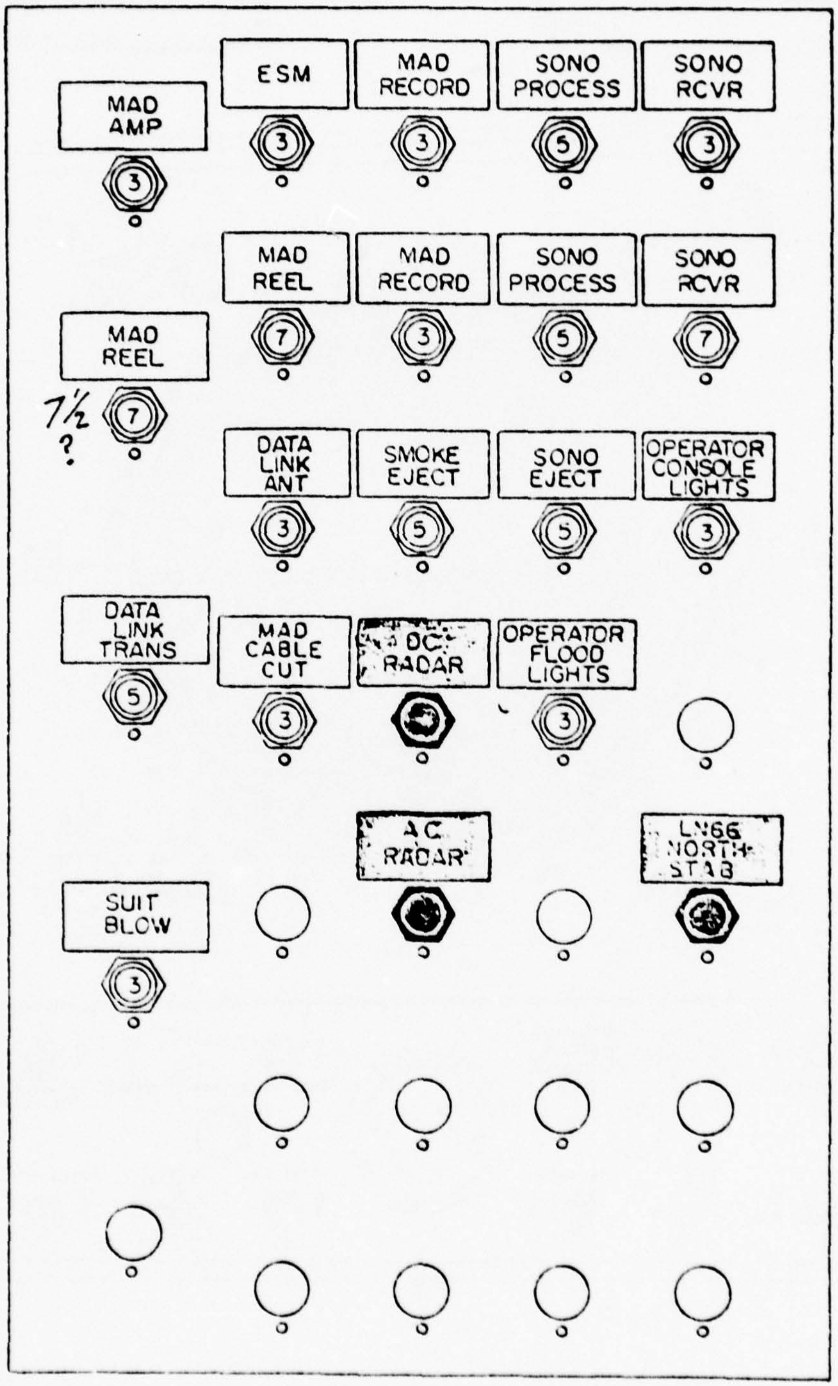


Figure 2-3

Fuse and Circuit Breaker Panels



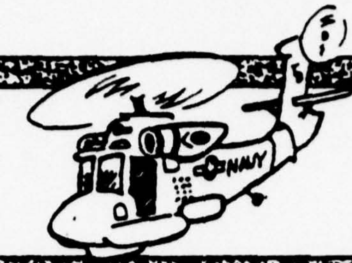
SENSOR OPERATOR'S CIRCUIT BREAKER PANEL

251-6

Figure 1-32 (Sheet 3 of 3)

SMALL-SCALE TRYOUT VERSION

TROUBLE SHOOTING THE LN-66HP



EXERCISE:

LESSON:

SEGMENT:

MEDIA: Workbook

OBJECTIVE

State the steps to trouble shoot the LN-66 Radar System.

GENERALITY

The steps to trouble shoot the LN-66 Radar are as follows:

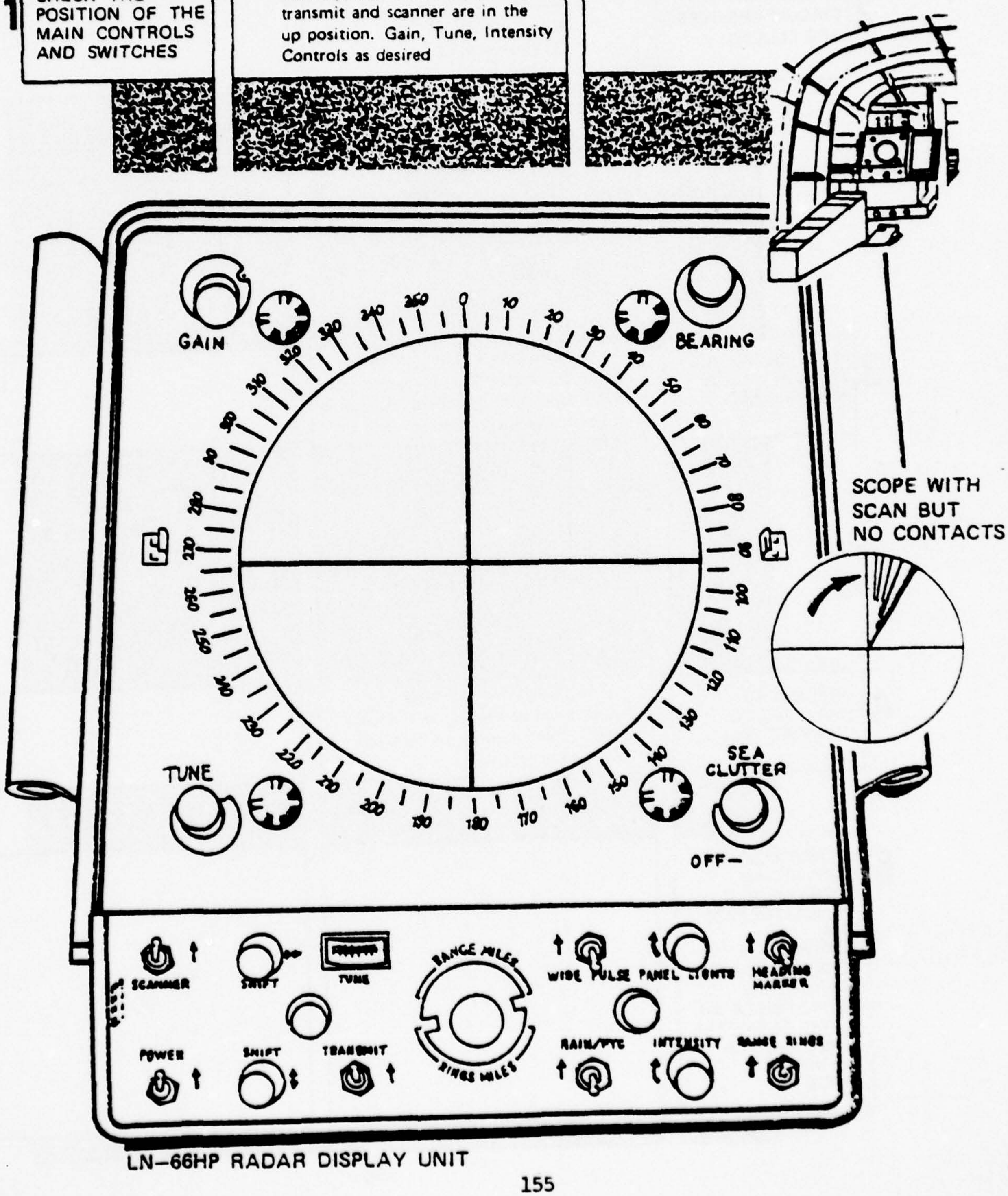
1. Check the position of operating controls and switches.
2. Check that the circuit breakers are closed.
3. Check the cannon plugs.
4. Check the wave guide connections.

INTRODUCTION

The LN-66 HP Radar, as any electronic equipment, is subject to breakdown. To allow the AW to operate the radar at 100% efficiency and to let the operator evaluate the condition of the system, trouble shooting procedures have been developed. The sensor operator should use these steps when the LN-66 HP radar will not operate normally.

TROUBLE SHOOTING THE LN-66HP

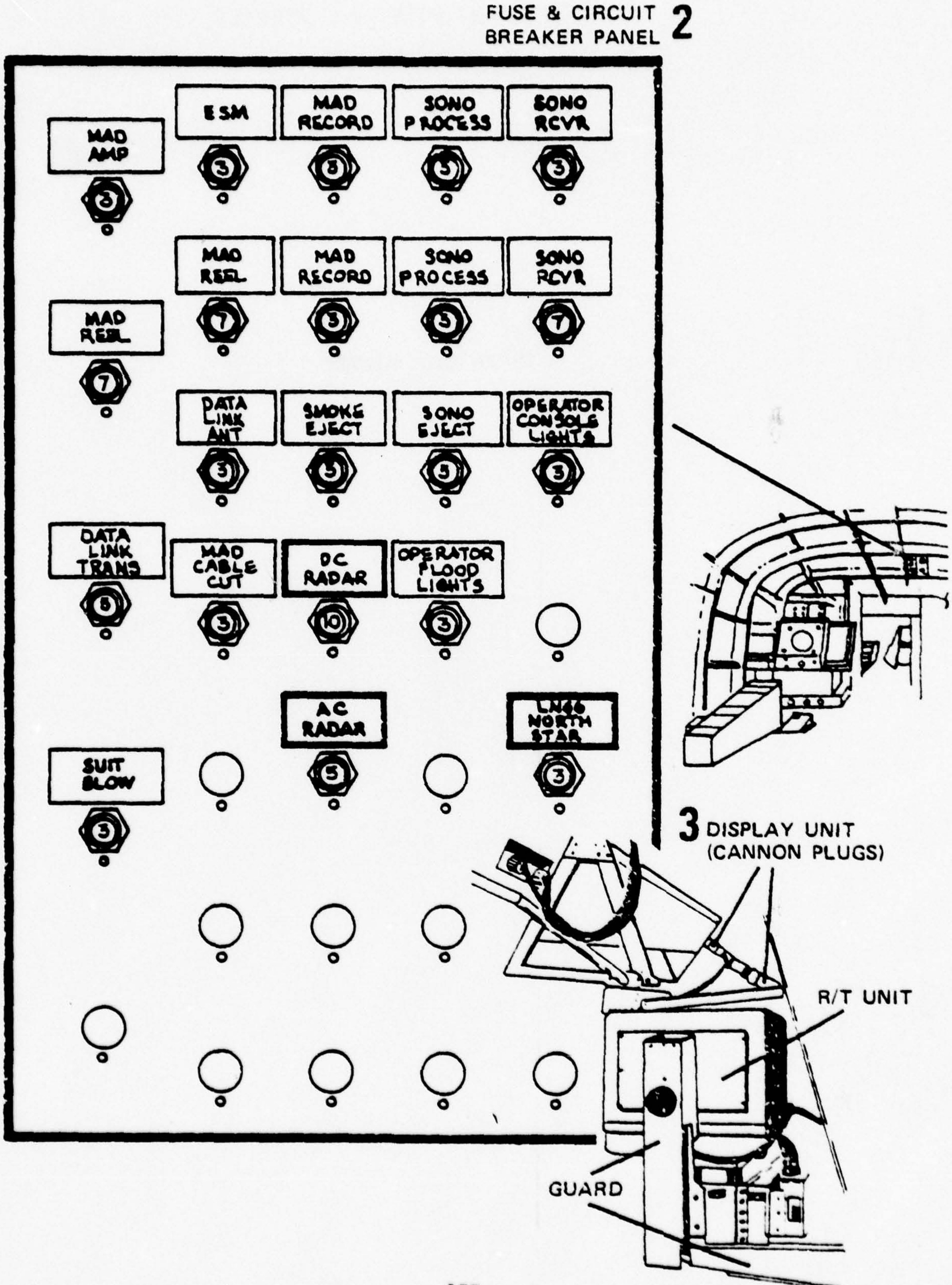
	PROCEDURE	ACTION PERFORMED	IMPORTANT NOTES AND COMMENTS
1	CHECK THE POSITION OF THE MAIN CONTROLS AND SWITCHES	Visually, check that the power, transmit and scanner are in the up position. Gain, Tune, Intensity Controls as desired	



LN—66HP RADAR DISPLAY UNIT

TROUBLE SHOOTING THE LN-66HP

	PROCEDURE	ACTION PERFORMED	IMPORTANT NOTES AND COMMENTS
2	CHECK THAT THE CIRCUIT BREAKERS ARE CLOSED	Reset all circiut breakers: Radar AC Radar DC LN-66 North Stab	
3	MAKE SURE ALL CANNON PLUGS ARE SECURE	AW will check the 2 cannon plugs on back of the display and 1 plug on front of R/T and behind the guard, by making sure the plugs are screwed on tight.	
4	CHECK THE WAVE GUIDE CONNECTIONS	AW will reach down to check the 2 connections available from the front of R/T, behind the guard, forward to the deck plate.	
5	IF THE PRECEDING STEPS ARE NOT EFFECTIVE IN SOLVING THE PROBLEM. NOTE RADAR SYMPTOMS ON THE KNEEBOARD AT THE COMPLETION OF THE FLIGHT. REPORT THE DISCREPANCY ON THE VIDS-MAF CARDS.		


FUSE & CIRCUIT BREAKER PANEL 2
ESM
MAD RECORD
SONO PROCESS
SONO RCVR
MAD AMP
MAD REEL
MAD RECORD
SONO PROCESS
SONO RCVR
MAD REEL
DATA LINK ANT
SMOKE EJECT
SONO EJECT
OPERATOR CONSOLE LIGHTS
DATA LINK TRANS
MAD CABLE CUT
DC RADAR
OPERATOR FLOOD LIGHTS
AC RADAR
NORTH STAR
SUIT BLOW
3 DISPLAY UNIT (CANNON PLUGS)
R/T UNIT
GUARD

TRYOUT DATA SUMMARY

SEGMENT EVALUATION RECORD

SEGMENT NO. LN-66 Troubleshooting EVALUATION DATE 7/30

EQUIPMENT Paper and Pen
also
Simulated LN-66

Type of instructor needed for instruction

- ___ Detachment Experience
- ___ Qualified HAC
- ___ RAG Graduate
- ___ Proctor (no pilot experience necessary)
- X Qualified Aircrewman

Type of instructor required to administer test

- ___ Detachment Experience
- ___ Qualified HAC
- ___ RAG Graduate
- ___ Proctor (no pilot experience necessary)
- ___ No Test
- X Qualified Aircrewman

NAMES OF STUDENTS

1. ___	6. ___
2. ___	7. ___
3. ___	8. ___
4. ___	9. ___
5. ___	10. ___

STUDENT PERFORMANCE SUMMARY

Student	Total answers	Total time		Number of correct answers required for mastery	Correct answers achieved	
		Instruction	Test		Total	%
1. Weber	5	5	4	5	5	100%
2. Lucas	5	7	5	5	5	100%
3. Wardman	5	10	6	5	4	80%
4. Dryden	5	8	4	5	5	100%
5.						
6.						
7.						
8.						
9.						
10.						

Total number of students achieving mastery 3

Percentage of students achieving mastery 75%

Remarks:

STUDENT ATTITUDE QUESTIONNAIRE

Segment No: LN-66 T/S
Date: 7/30

( ) Place a check mark in the appropriate box

1. RELEVANCE: In relation to my job and career, I considered the instruction

1	a.	extremely relevant
3	b.	relevant
	c.	irrelevant
	d.	extremely irrelevant

2. ENJOYMENT: The instruction was

	a.	extremely enjoyable
4	b.	enjoyable
	c.	unenjoyable
	d.	extremely unenjoyable

3. AMOUNT: The amount of information covered in this segment was

	a.	overwhelming in the time allotted
3	b.	kept me busy
1	c.	easily completed in time allotted
	d.	completed almost immediately

4. INTEREST: The materials covered is

	a.	extremely interesting
4	b.	interesting
	c.	boring
	d.	extremely boring

5. CHALLENGE: The instruction in this segment was

	a.	too demanding
4	b.	challenging
	c.	not really challenging
	d.	too simple

( ) Place a check mark in the appropriate box

6. PREFERENCE: If given a choice for future instruction, I would

3	a. like to take more instruction in this form
	b. not like to take any instruction in this form
	(If b chosen, fill in c.) c. Suggest ________ ________ form for this instruction.

7. QUESTIONS: The instruction allowed for

3	a. opportunities to get unclear points clarified
1	b. not enough opportunities to get unclear points clarified

8. ORGANIZATION: The concepts in the instruction of the material in this lesson were

	a. extremely organized
4	b. organized
	c. unorganized
	d. completely unorganized

( ) Place a check mark in the appropriate box

Item	Count		Response
9. TESTS: I found tests	3	a.	covered only the instructional material
	1	b.	covered material not included in the instruction
10. FEEDBACK: Opportunities for feedback were		a.	completely adequate
	4	b.	adequate
		c.	inadequate
		d.	completely inadequate
11. MATERIALS: Audiovisual aids, workbook formats were	2	a.	extremely easy to understand
	1	b.	understandable
*	1	c.	difficult to understand
		d.	completely confusing
		e.	If c and/or d, please specify: ______

* Has had no intro to the material.

REVISION SPECIFICATION

MASTER

TROUBLE SHOOTING THE LN-66HP

EXERCISE:

LESSON:

SEGMENT:

MEDIA: Workbook

OBJECTIVE

State the steps to trouble shoot the LN-66 Radar System.

GENERALITY

The steps to trouble shoot the LN-66 Radar are as follows:

1. Check the position of operating controls and switches.
2. Check that the circuit breakers are closed.
3. Check the cannon plugs.
4. Check the wave guide connections.
5. IF TROUBLE SHOOTING DOES NOT ~~KEEP~~ WORK, SECURE POWER.

UNIIM S+C

~~[illegible]~~

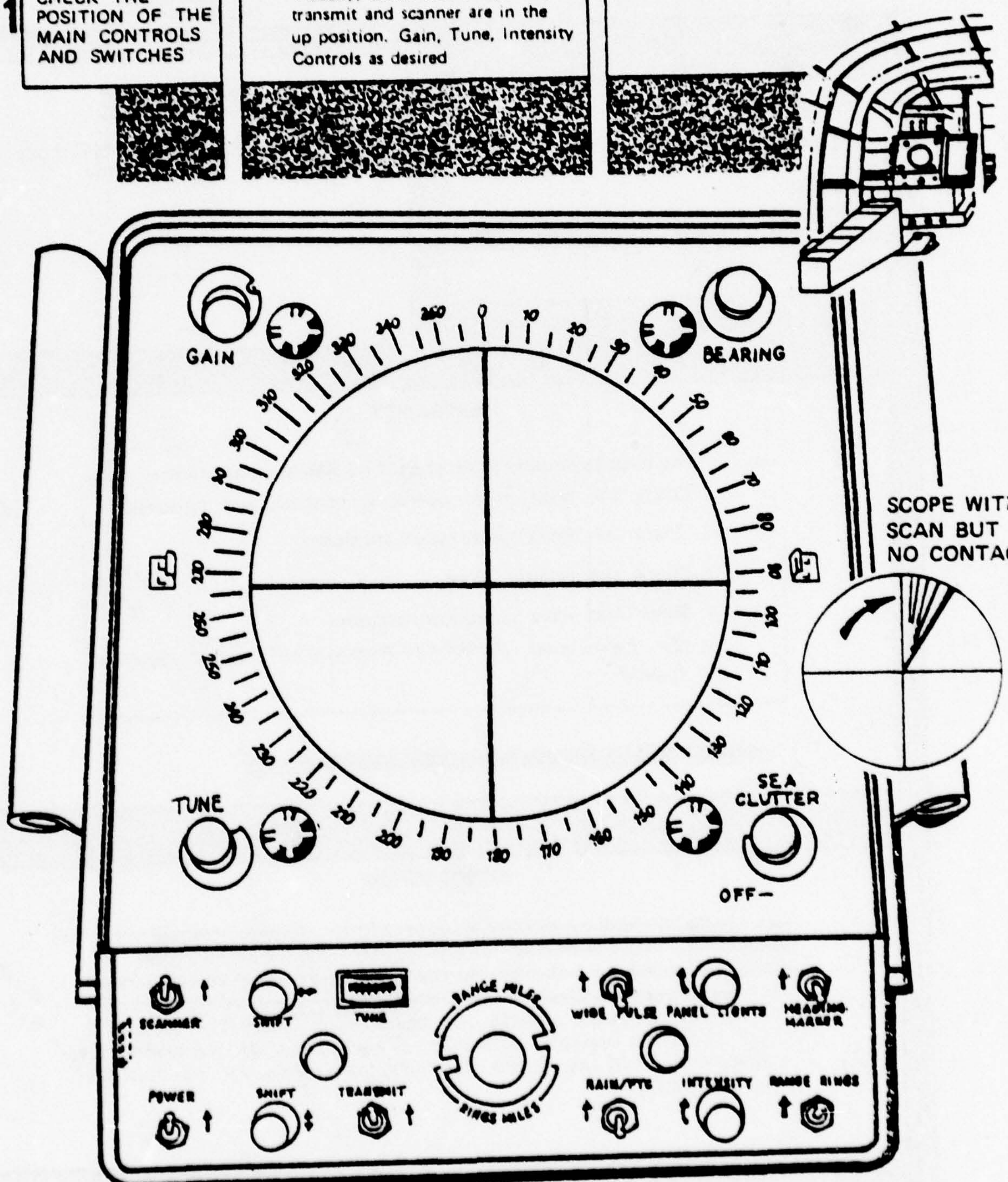
INTRODUCTION

~~The LN-66 HP Radar, as any electronic equipment, is subject to breakdown. To allow the AW to operate the radar at 100% efficiency and to let the operator evaluate the condition of the system, trouble-shooting procedures have been developed.~~ The sensor operator should use these TROUBLE SHOOTING steps when the LN-66 HP radar will not operate normally. SYMPTOMS OF ABNORMAL OPERATION ARE NO VIDEO DISPLAY, OR INABILITY TO TUNE THE SYSTEM.

UNIIM S+C

TROUBLE SHOOTING THE LN-66HP

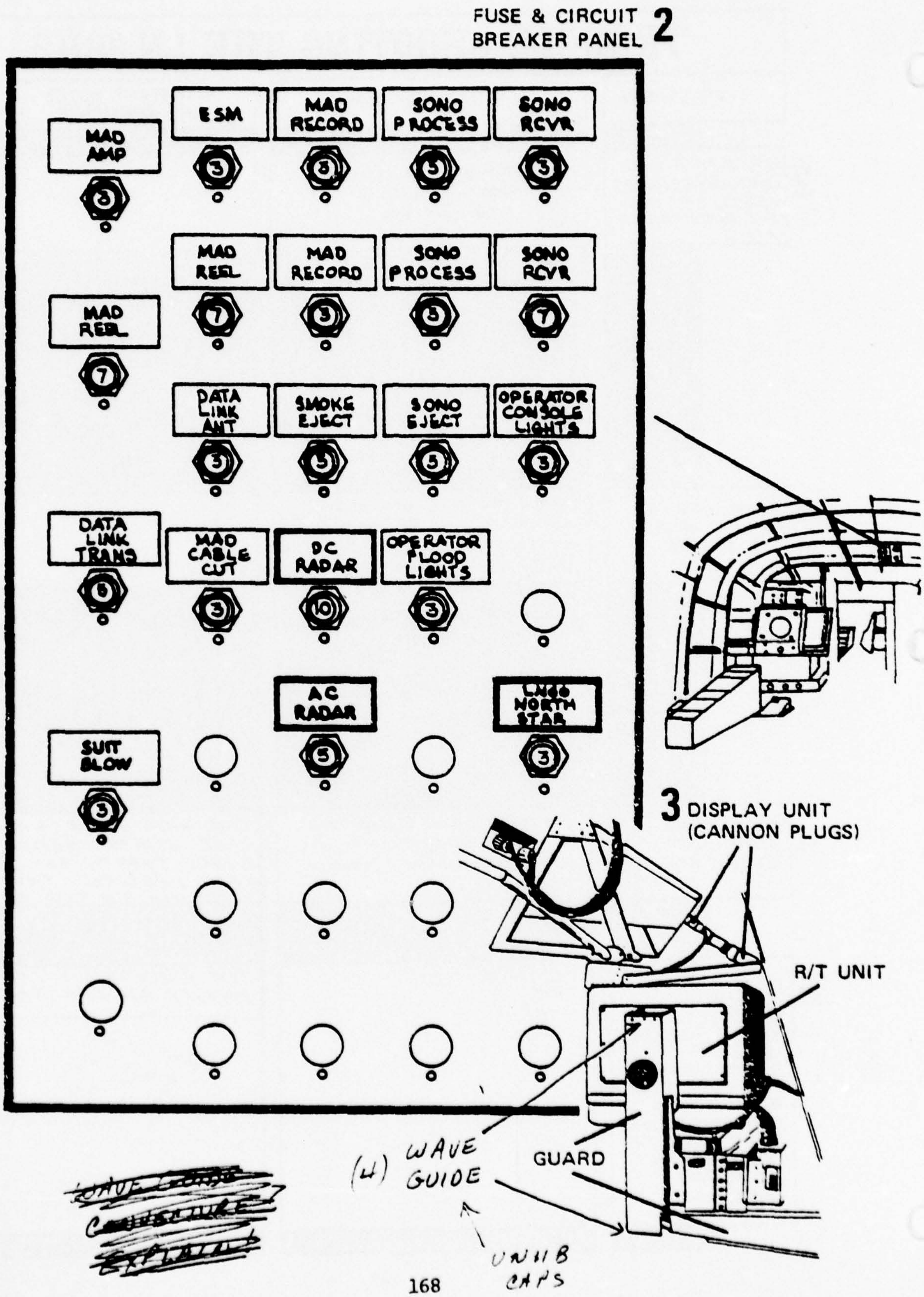
	PROCEDURE	ACTION PERFORMED	IMPORTANT NOTES AND COMMENTS
1	CHECK THE POSITION OF THE MAIN CONTROLS AND SWITCHES	Visually, check that the power, transmit and scanner are in the up position. Gain, Tune, Intensity Controls as desired	



LN—66HP RADAR DISPLAY UNIT

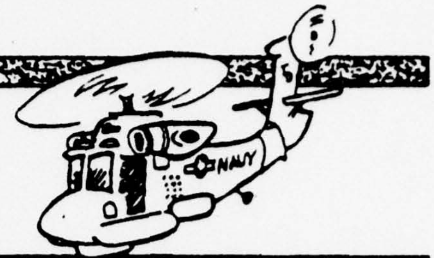
TROUBLE SHOOTING THE LN-66HP

	PROCEDURE	ACTION PERFORMED	IMPORTANT NOTES AND COMMENTS
2	CHECK THAT THE CIRCUIT BREAKERS ARE CLOSED IN THE OVERHEAD PANEL.	UN 10M CAPS Reset all circuit breakers: Radar AC Radar DC LN-66 North Stab	
3	MAKE SURE ALL CANNON PLUGS ARE SECURE	AW will check the 2 cannon plugs on back of the display and 1 plug on front of R/T and behind the guard, by making sure the plugs are screwed on tight.	
4	CHECK THE WAVE GUIDE CONNECTIONS	AW will reach down to check the 2 connections available from the front of R/T, behind the guard, forward to the deck plate.	THE WAVE GUIDE IS A HOLLOW TUBE, LOCATED BEHIND THE GUARD, THAT GUIDES THE RADIO FREQUENCY FROM THE ANTENNA TO THE R/T
5	IF THE PRECEDING STEPS ARE NOT EFFECTIVE IN SOLVING THE PROBLEM, SECURE POWER NOTE RADAR SYMPTOMS ON THE KNEE BOARD AT THE COMPLETION OF THE FLIGHT. REPORT THE DISCREPANCY ON THE VIDS MAF CARDS.	UN 10M CAPS	FOR PROCESSING THE DISPLAY ON THE RADAR UN 10M S+C


FUSE & CIRCUIT BREAKER PANEL 2
MAD AMP
ESM
MAD RECORD
SONO PROCESS
SONO RCVR
MAD REEL
MAD RECORD
SONO PROCESS
SONO RCVR
MAD REEL
DATA LINK ANT
SMOKE EJECT
SONO EJECT
OPERATOR CONSOLE LIGHTS
DATA LINK TRANS
MAD CABLE CUT
DC RADAR
OPERATOR FLOOD LIGHTS
AC RADAR
NORTH STAR
SUIT BLOW
3 DISPLAY UNIT (CANNON PLUGS)
R/T UNIT
GUARD
(4) WAVE GUIDE

REVISED SEGMENT

TROUBLE SHOOTING THE LN-66HP



EXERCISE:

LESSON:

SEGMENT:

MEDIA: Workbook

OBJECTIVE

State the steps to trouble shoot the LN-66 Radar System.

GENERALITY

The steps to trouble shoot the LN-66 HP Radar are:

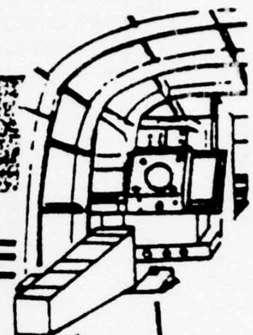
1. Check the position of operating controls and switches.
2. Check that the circuit breakers are closed.
3. Check the cannon plugs.
4. Check the wave guide connections.
5. If troubleshooting does not work, secure power.

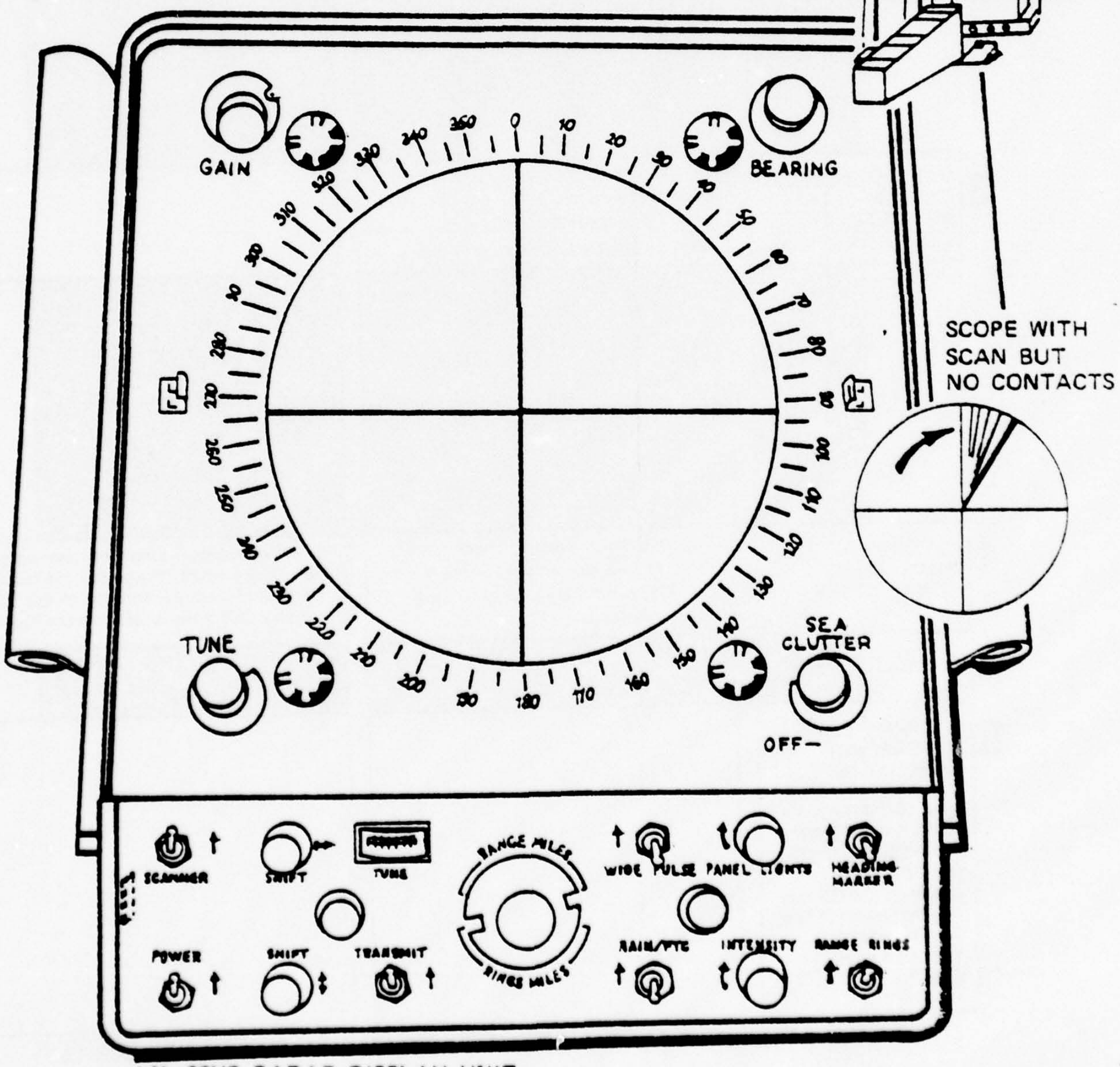
INTRODUCTION

The sensor operator should use the troubleshooting steps when the LN–66 HP radar will not operate normally. Symptoms of abnormal operation are no video display, or inability to tune the system.

TROUBLE SHOOTING THE LN-66HP

	PROCEDURE	ACTION PERFORMED	IMPORTANT NOTES AND COMMENTS
1	CHECK THE POSITION OF THE MAIN CONTROLS AND SWITCHES	Visually, check that the power, transmit and scanner are in the up position. Gain, Tune, Intensity Controls as desired	

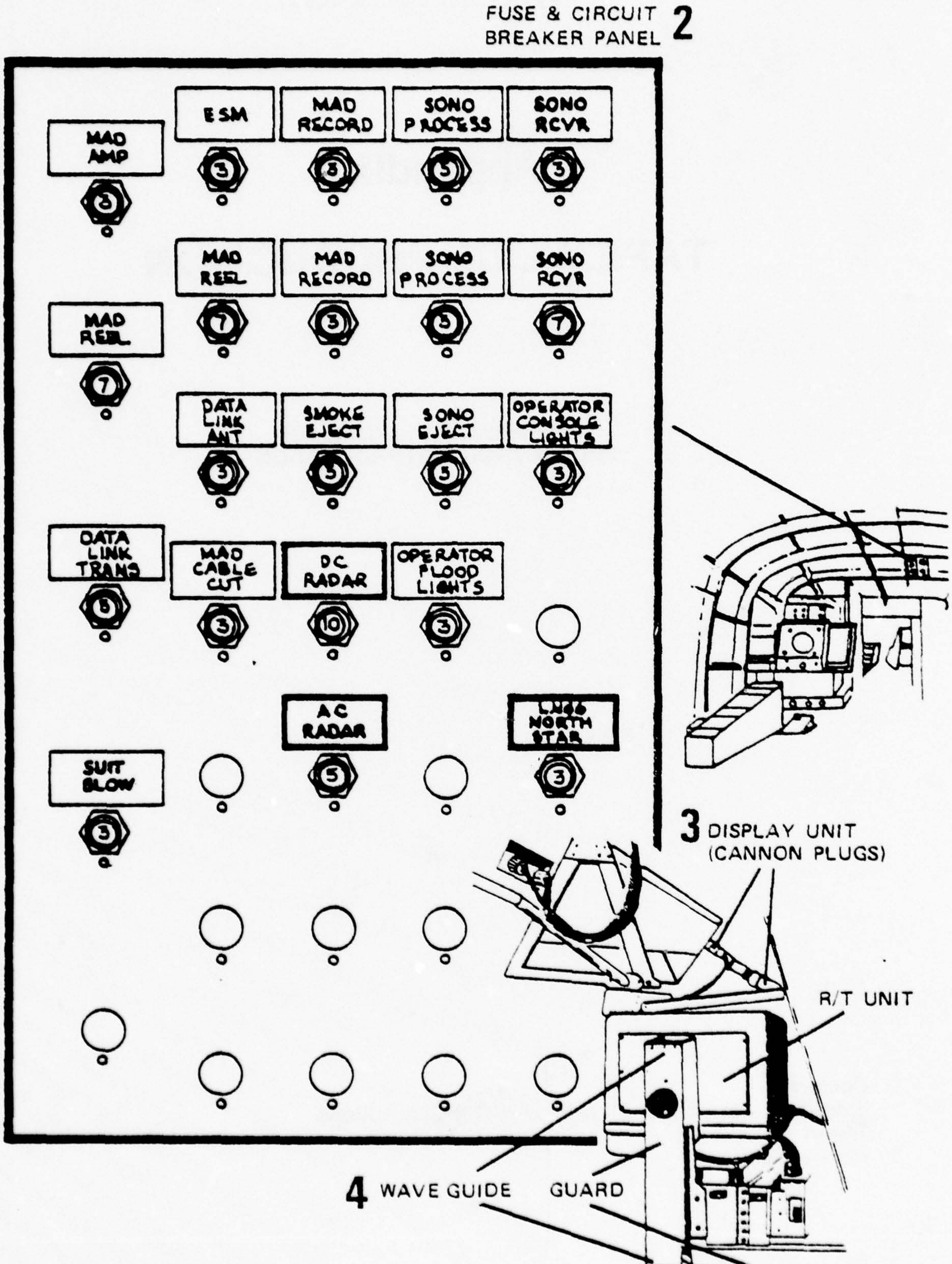




LN—66HP RADAR DISPLAY UNIT

TROUBLE SHOOTING THE LN-66HP

	PROCEDURE	ACTION PERFORMED	IMPORTANT NOTES AND COMMENTS
2	CHECK THAT THE CIRCUIT BREAKERS ARE CLOSED IN THE OVERHEAD PANEL	Reset all circiut breakers: Radar AC Radar DC LN-66 North Stab	
3	MAKE SURE ALL CANNON PLUGS ARE SECURE	AW will check the 2 cannon plugs on back of the display and 1 plug on front of R/T and behind the guard, by making sure the plugs are screwed on tight.	
4	CHECK THE WAVE GUIDE CONNECTIONS	AW will reach down to check the 2 connections available from the front of R/T, behind the guard, forward to the deck plate.	The wave guide is a hollow tube located behind the guard that guides the radio frequency from the antenna to the R/T for processing the display on the radar.
5	IF THE PRECEDING STEPS ARE NOT EFFECTIVE IN SOLVING THE PROBLEM, SECURE POWER, NOTE RADAR SYMPTOMS ON THE KNEE BOARD AT THE COMPLETION OF THE FLIGHT, REPORT THE DISCREPANCY ON THE VIDS-MAF CARDS.		


FUSE & CIRCUIT BREAKER PANEL 2
MAD AMP
ESM
MAD RECORD
SONO PROCESS
SONO RCVR
MAD REEL
MAD REEL
MAD RECORD
SONO PROCESS
SONO RCVR
DATA LINK ANT
SMOKE EJECT
SONO EJECT
OPERATOR CONSOLE LIGHTS
DATA LINK TRANS
MAD CABLE CUT
DC RADAR
OPERATOR FLOOD LIGHTS
AC RADAR
NORTH STAR
SUIT BLOW
3 DISPLAY UNIT (CANNON PLUGS)
R/T UNIT
4 WAVE GUIDE
GUARD

Appendix C

TAPE/SLIDE PRODUCTION

INTERMEDIATE TAPE/SLIDE PRODUCTS DURING PRODUCTION

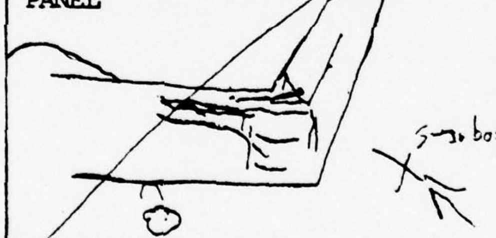
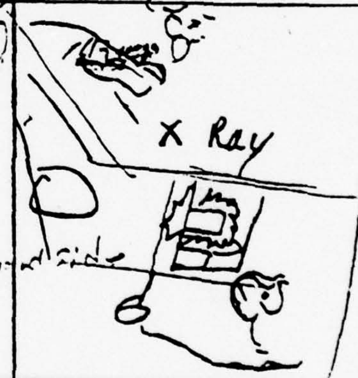
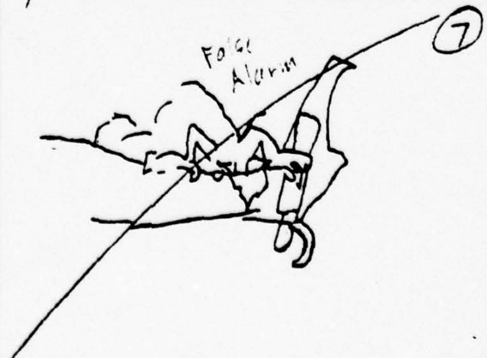
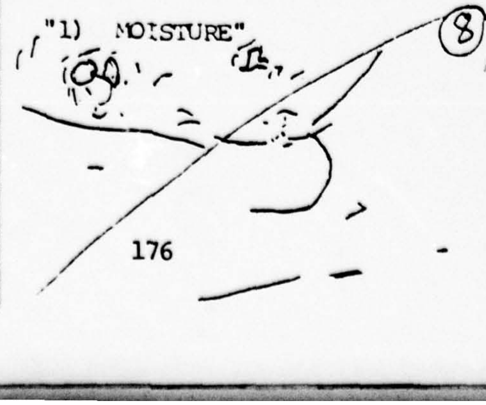
Contents

FIRST DRAFT STORYBOARD

SHOWING ARTIST'S CONCEPTIONS

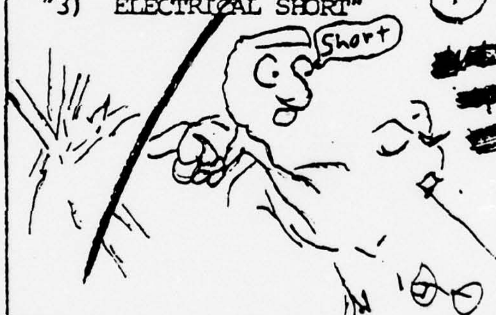
SEGMENT NO: 2.4.4.7 TITLE: ______

AUTHOR: ______

AUDIO	VIDEO	REMARKS
The chip detector is located just below the sight line on the starboard side of the intermediate gear box.	DIAGRAM 5 	
The chip detector's function is to show the accumulation of particles within the intermediate gear box , and when the electrical circuit closes, the Intermediate Chip Light goes on.	DIAGRAM ON CONNECTION BETWEEN CHIP DETECTOR'S PLUGS AND THE LIGHT IN THE CAUTION LIGHT PANEL 6 	
You will find that there are times when the Intermediate Chip Light will go on when the chip detector does not have an accumulation of metal particles.	7 	
One possible cause, water may have accumulated around the electrical switch at the chip plug and caused a short.	"1) MOISTURE" 8 	

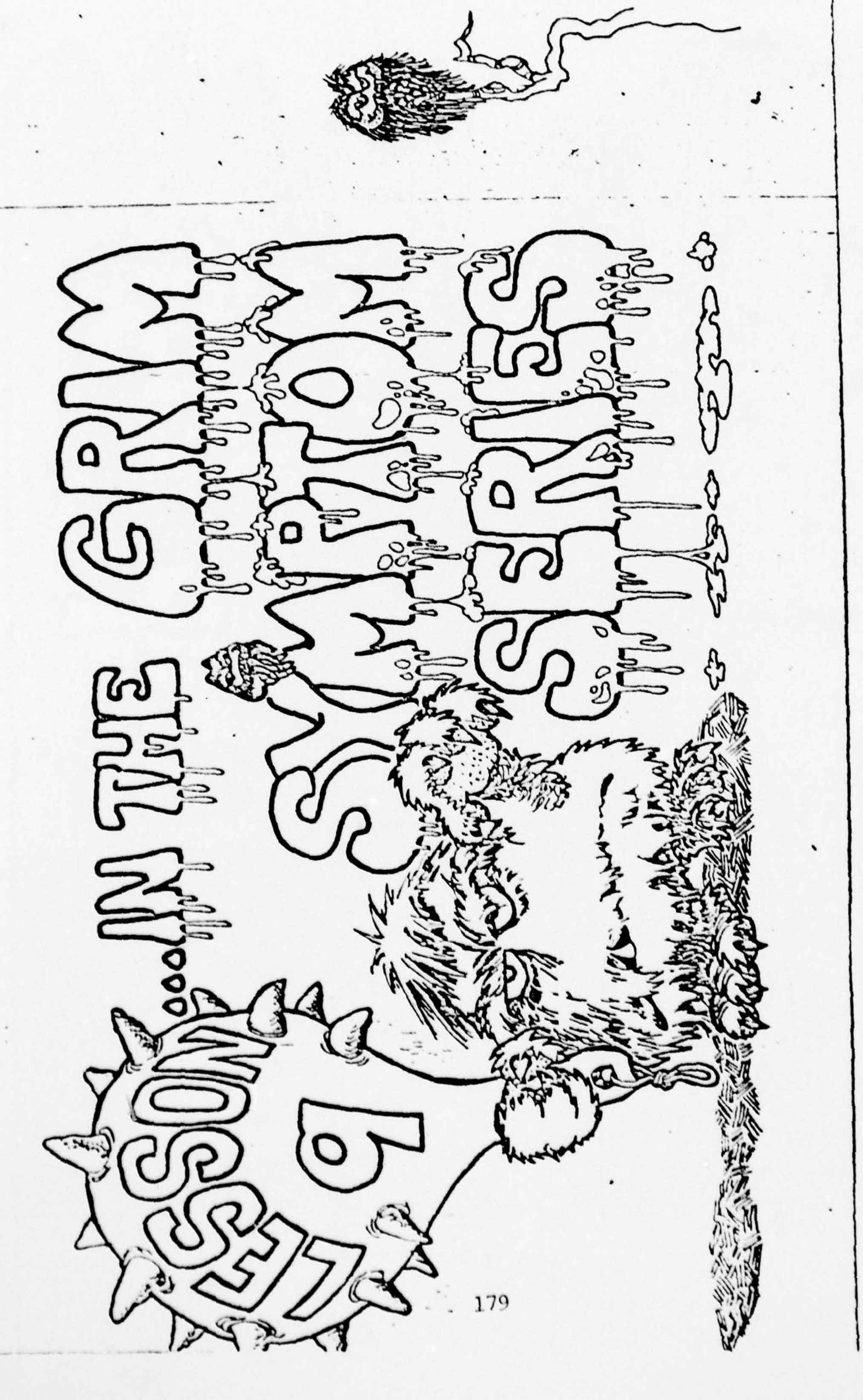
SEGMENT NO: ______________ TITLE: ______________________

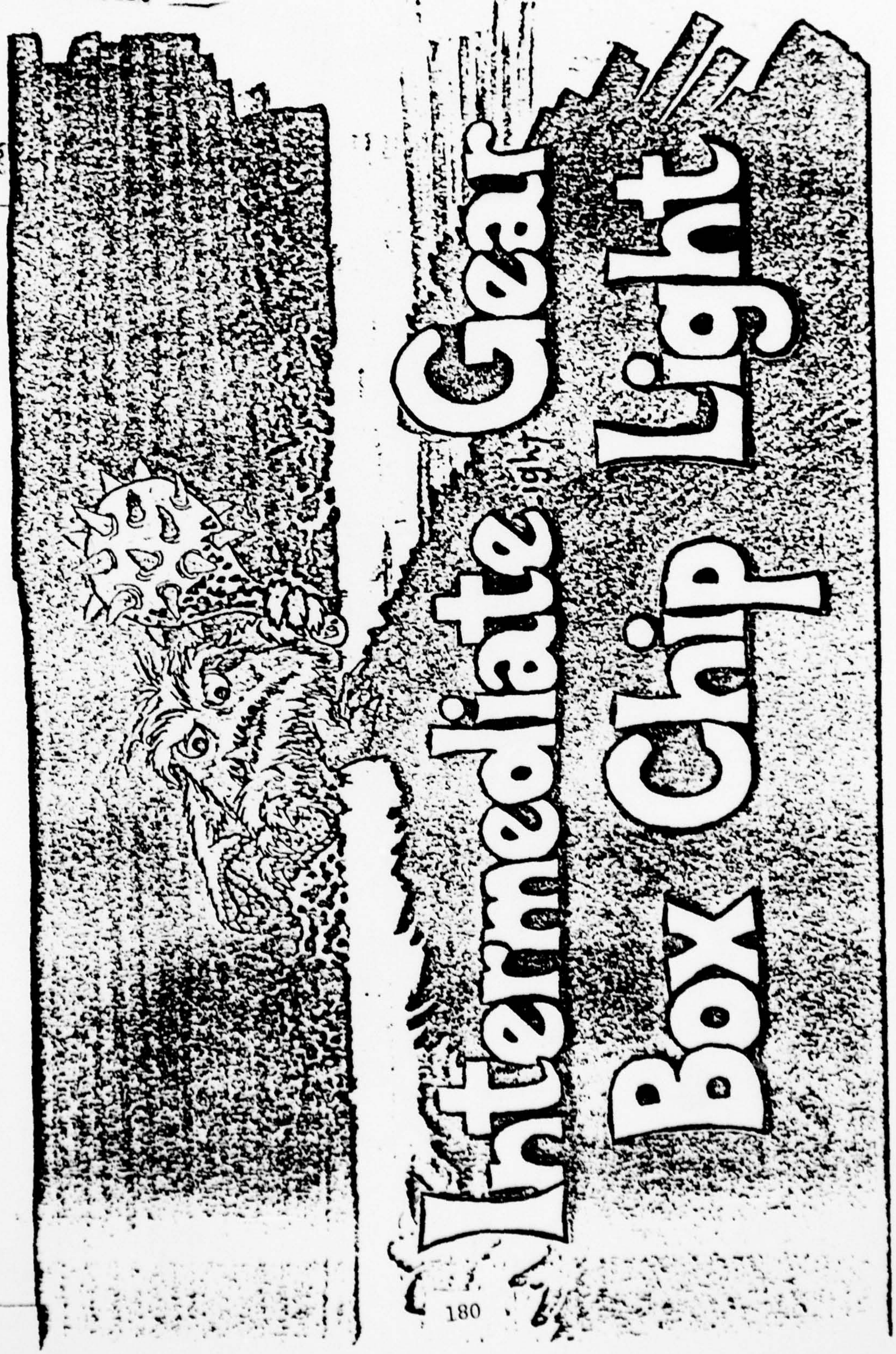
AUTHOR: ______________________

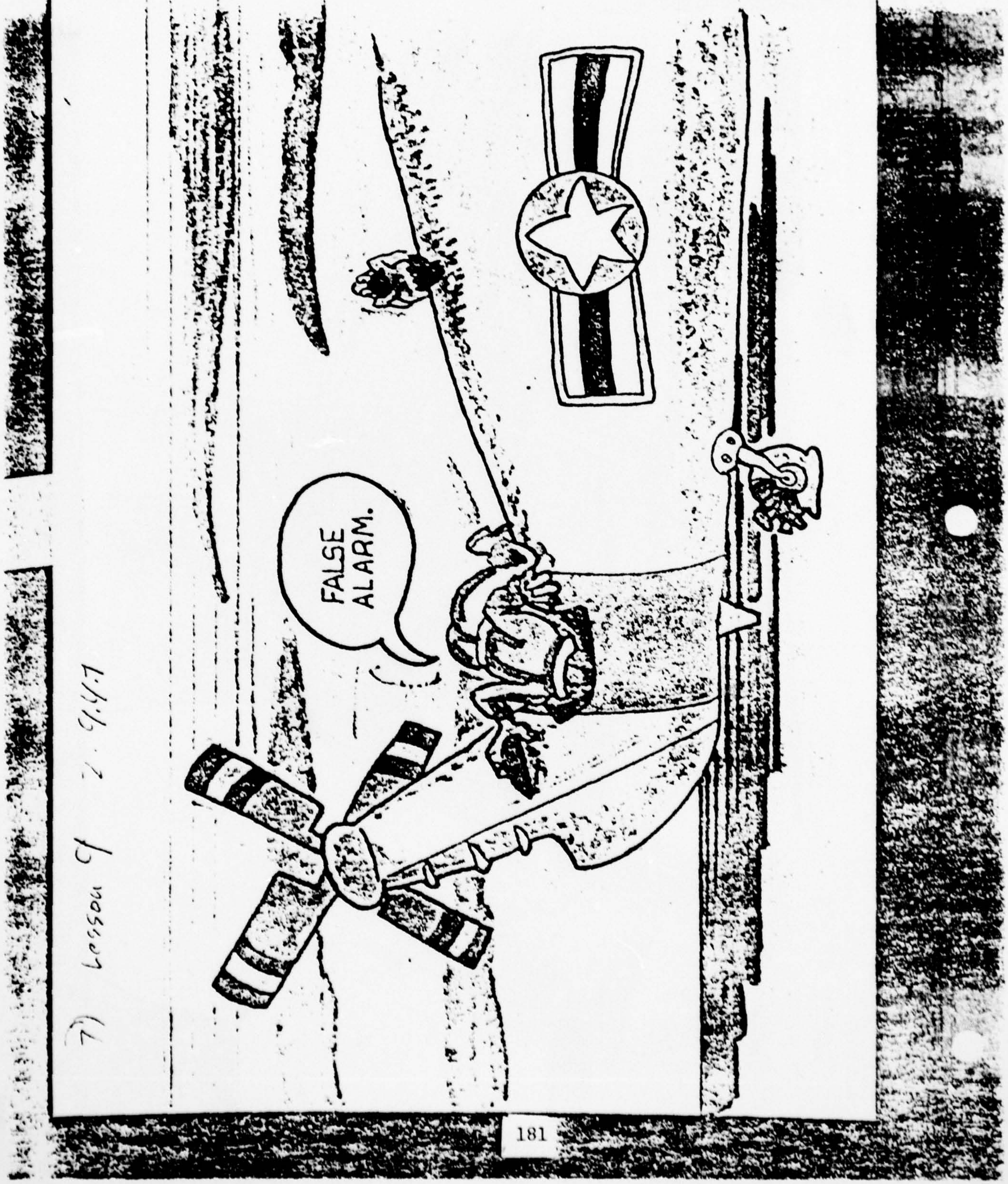
AUDIO	VIDEO	REMARKS
Carbon may build up on the detector sensing probes and close the electrical circuit.	~~"2) CARBON DEPOSITS"~~ 9 	
A short in the wire connecting the Chip Detector and the Intermediate Gear Box Chip Light will cause the light to go on.	~~"3) ELECTRICAL SHORT"~~ 10 	[redacted] ~~Ruben~~ Rueben Goldstein
Whatever the cause of the light going on, the important thing to remember is this--something caused the light to go on. Don't try to second guess the cause. Always react according to NATOPS procedures.	~~According TO Natops~~ 11	Important
When the Intermediate Gear Box Chip Light goes on, the NATOPS procedure is as follows: 1) If over land--land as soon as possible.	12 "1) IF OVER LAND -- LAND AS SOON AS POSSIBLE." SUPERIMPOSED ON SLIDE OF HELO FLYING OVER LAND	Xerox Technique

TRYOUT VERSION ART

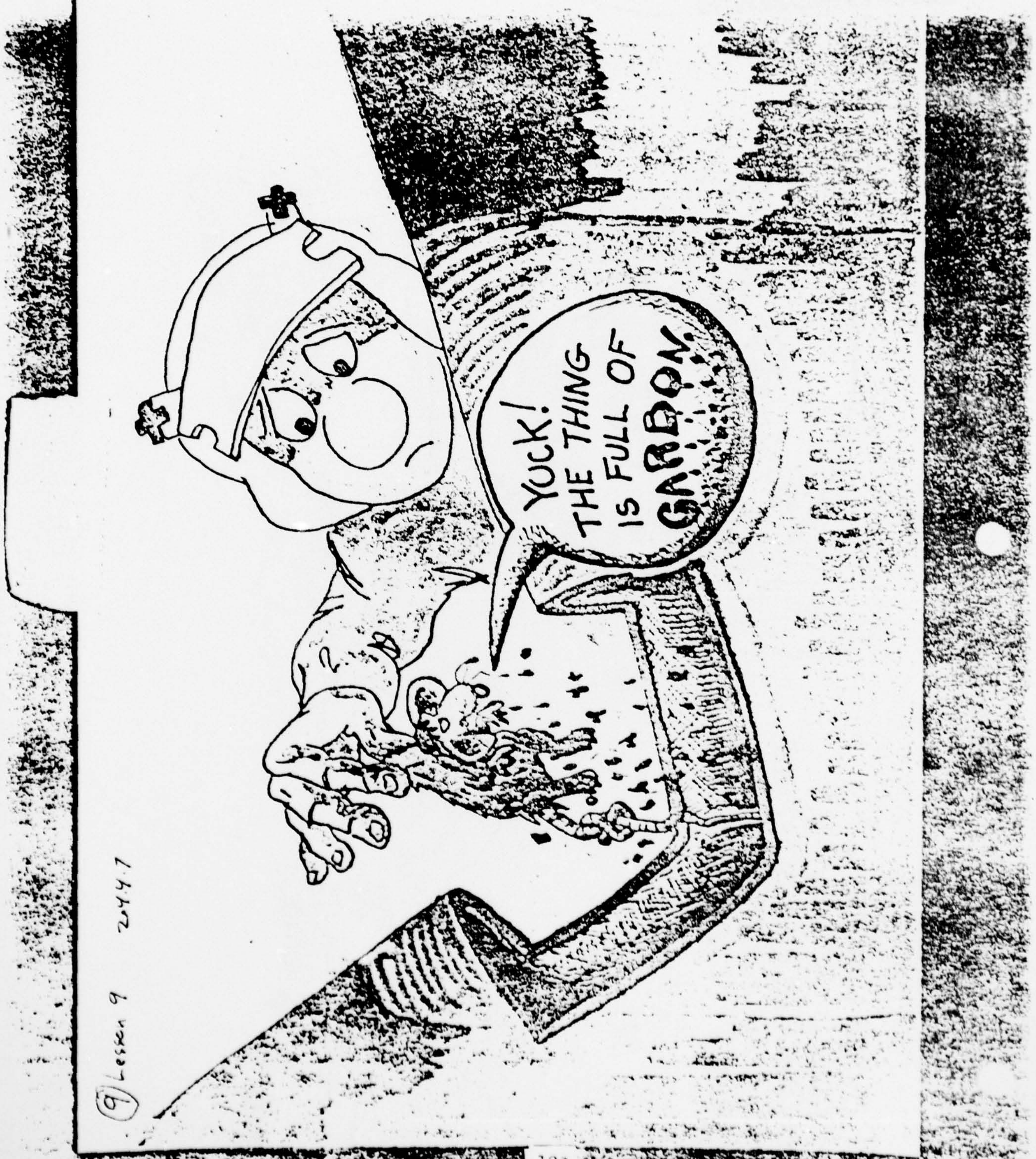
① Lesson 9 2.4.4.7

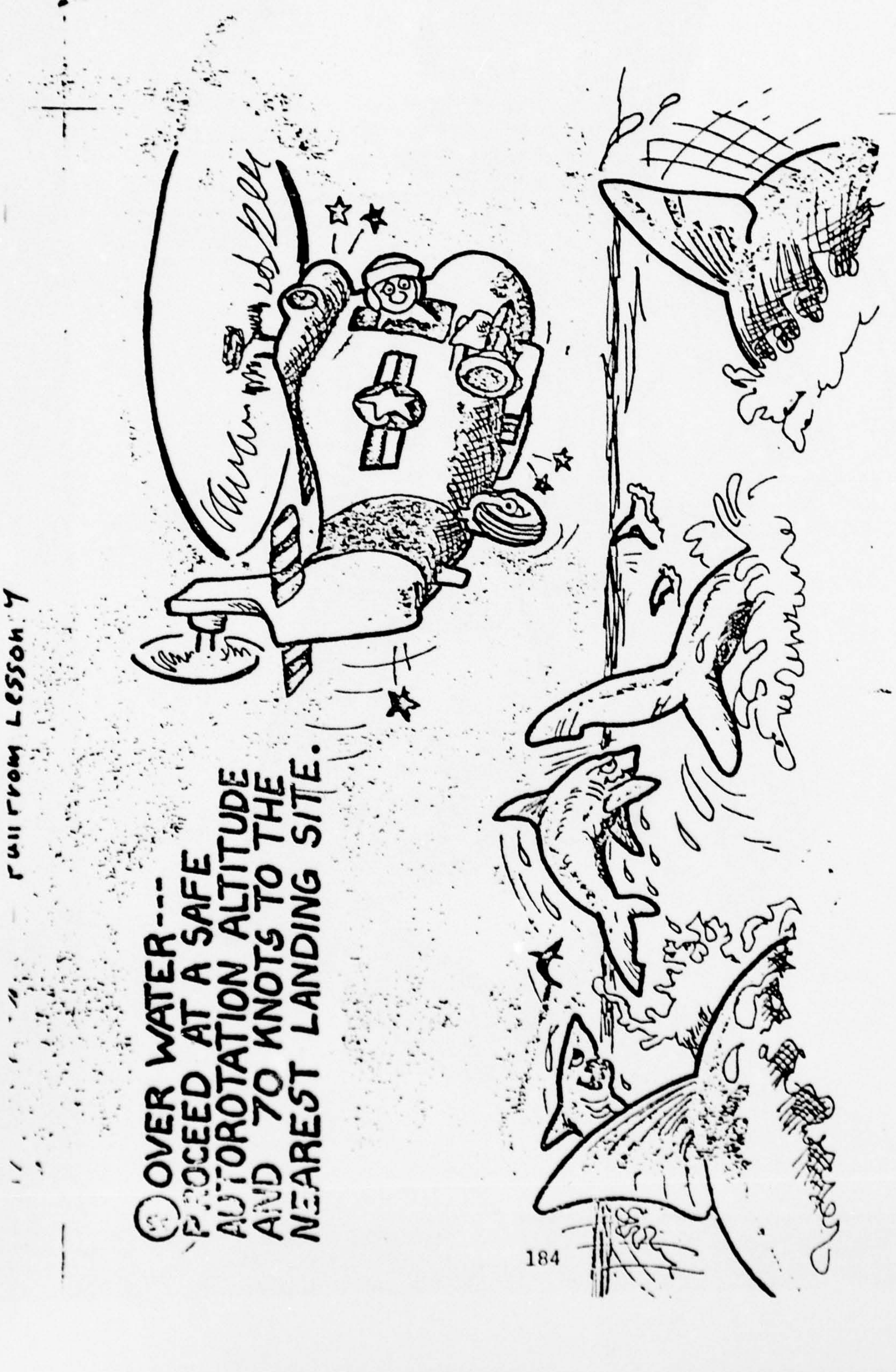


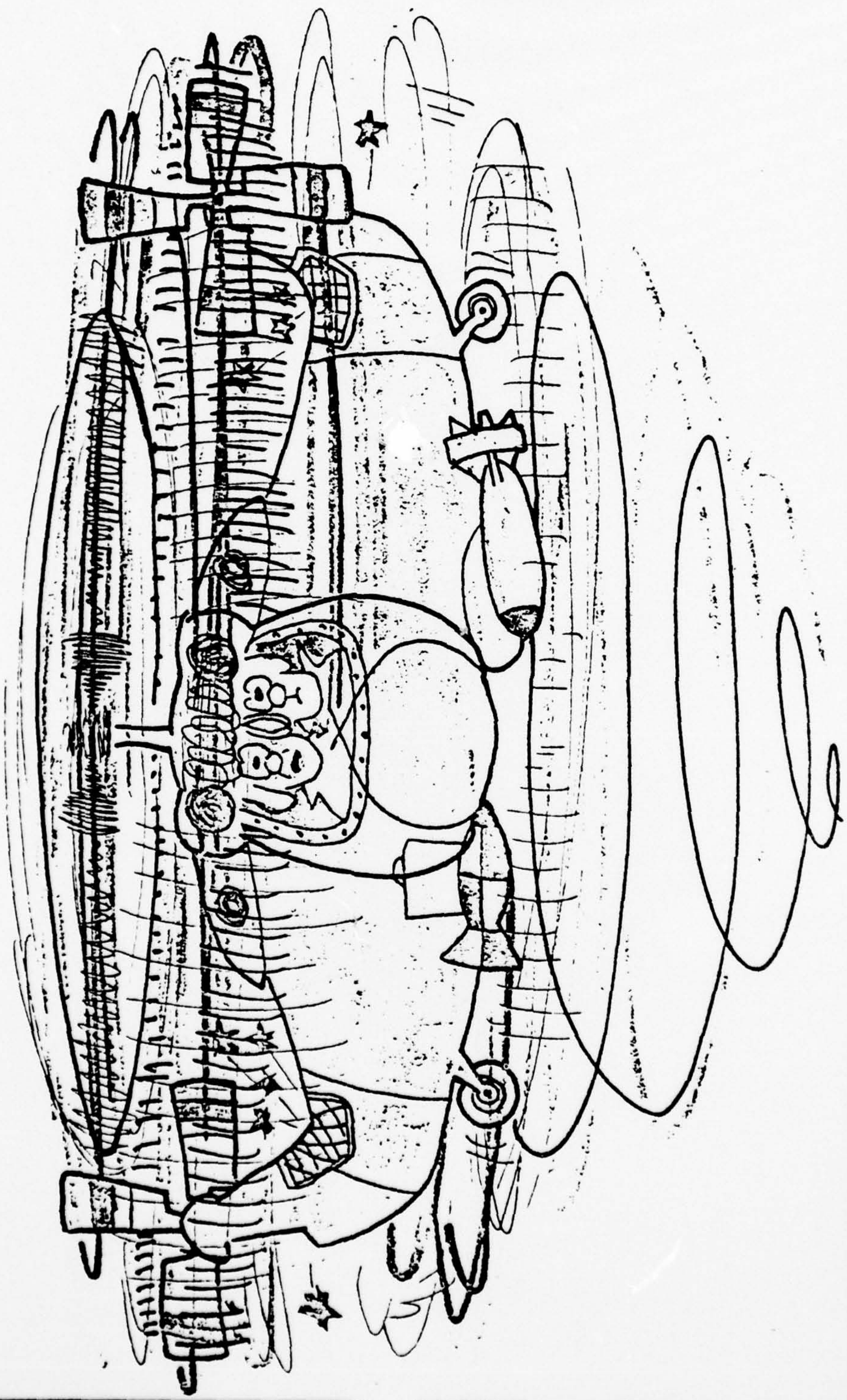

Intermediate Gear
Box Chip Light


FALSE ALARM.


8
Lesson 9


YUCK! THE THING IS FULL OF GARBON.


OVER WATER---
PROCEED AT A SAFE
AUTOROTATION ALTITUDE
AND 70 KNOTS TO THE
NEAREST LANDING SITE.



14 Lesson #9 2.4.4.7

REVISED SCRIPT

SEGMENT NO: 2.3.1.5

TITLE: "INTERNAL ENGINE FIRE"

AUTHOR: Carrick 20 11

AUDIO	VIDEO	REMARKS
NARRATOR: Lesson #6 in the Grim Symptom Series.	1 GRIM SYMPTOM SERIES TITLE PAGE Xrox Title W/6	
An Internal Engine Fire is a Grim Symptom.	GRIM SYMPTOM SHADOW WITH LESSON TITLE 2 Xrox Shadow of title	
A malfunction in the aircraft's fuel control could cause an internal engine fire.	SLIDE OF TS GAUGE WITH THE GRIM SYMPTOM PUSHING THE NEEDLE ABOVE THE 300 DEGREES CENTIGRADE MARK fix — 3 ?	
The objective of this lesson is: Identify the ~~cues and alerts~~ symptoms of an internal engine fire and state the ~~corrective action performed in accordance with NATOPS.~~ corrective ~~[illegible]~~ ~~[illegible]~~ Procedure	4 "OBJECTIVE" (RUBBER STAMPED) "IDENTIFY ~~THE CUES AND ALERTS~~ SYMPTOMS OF AN INTERNAL ENGINE FIRE AND STATE THE ~~CORRECTIVE ACTION PERFORMED IN ACCORDANCE WITH NATOPS."~~ CORRECTIVE PROCEDURES	~~[illegible]~~

SEGMENT NO: 2.3.1.5 TITLE:

AUTHOR:

AUDIO	VIDEO	REMARKS
During shutdown and during aborted starts, carefully monitor the T5 gauge for a possible internal engine fire. FIG. 1-9	CLOSE-UP OF T5 GAUGE 5	
On a normal shutdown, as the engine unwinds, the T5 gauge will drop down to about 100 degrees centigrade. Then, as the engine stops, the T5 gauge will rise as the flow of air through the engine stops.	6 6	
Watch the T5 gauge carefully. If it registers 300 degrees centigrade or more, or if the Plane Captain gives you a fire signal -- carry out the NATOPS emergency procedure for an internal engine fire. insert #16 cancel #7	7	SHOW GRAPHIC ? OF FIRE SIGNAL. LAZY 8 ∞
The NATOPS emergency procedure for an internal engine fire is as follows: insert NATOPS	8	

Appendix D

VIDEOTAPE PRODUCTION

INTERMEDIATE VIDEOTAPE PRODUCTS DURING PRODUCTION

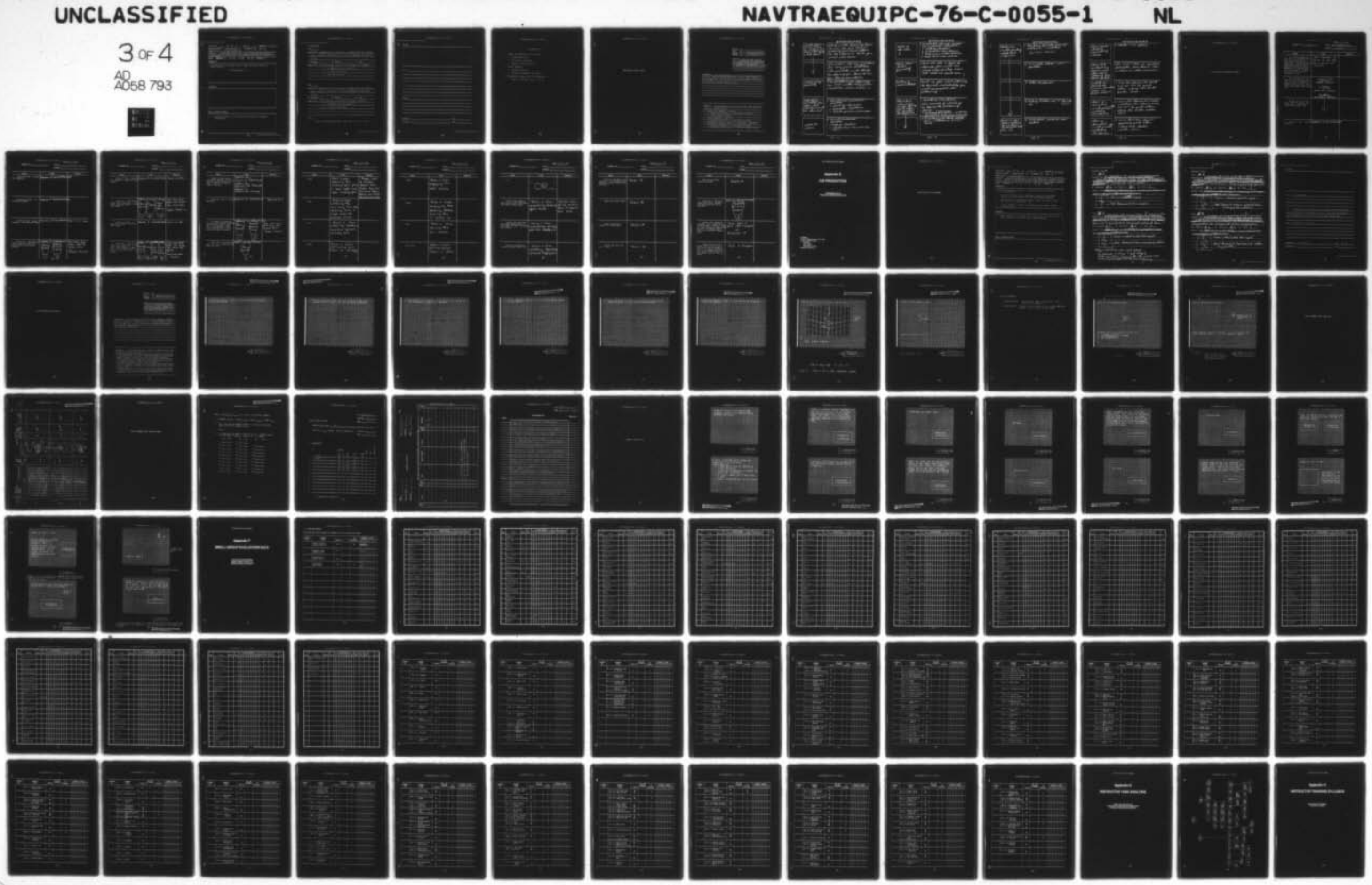
Contents

A Lesson Specification Document
A Preliminary Author's Script
A Final-Draft Scriptwriter's Script

LESSON SPECIFICATION DOCUMENT

AD-A058 793 COURSEWARE INC SAN DIEGO CALIF F/G 5/9
SH-2F LAMPS INSTRUCTIONAL SYSTEMS DEVELOPMENT. PHASE II.(U)
MAR 78 A S GIBBONS, J P HYMES N61339-76-C-0055
UNCLASSIFIED NAVTRAEQUIPC-76-C-0055-1 NL

3 OF 4
AD
A058 793



SECTION NO: 1 UNIT NO: 1 LESSON NO: 3 SEGMENT NO: 2.1.3.1.1.2

BEHAVIOR/CONTENT: CLASSIFICATION ☐ PROCEDURAL ☒ RULE ☐

LESSON TITLE: Aircraft Handling

OBJECTIVE: Given an SH2F aboard ship, demonstrate the procedures for stowage under all conditions in accordance with NAVAIR 01-260HCD-2-1 & 01-260HCD-1

MEDIA: WORKBOOK ☐ T/S ☐ V/T ☒ CAI ☐ TRAINER ☐

GENERALITY:

The procedure for stowing an SH2F under any given condition aboard ship is:

See Attachment (I)

ALGORITHM:

SPECIAL TEACHING POINTS:

1. Protective covers to be installed according to squadron instructions.

INSTANCE SPECS

TYPE 1

DESCRIPTION: Demonstration of procedure to prepare helo for stowage under shipboard conditions with launch not imminent by qualified person.

NO. EXAMPLES 1 NO. PRACTICE 1 NO. TEST

SAMPLE ITEM: Stow helicopter aboardship with launch not imminent.

a. Accomplish parking checklist.

b. Tie helicopter down.

c. Boot spread blades.

TYPE 2

DESCRIPTION: Demonstration of procedure to prepare helo for stowage under shipboard conditions with launch imminent by qualified person.

NO. EXAMPLES 1 NO. PRACTICE 1 NO. TEST

SAMPLE ITEM: Stow helicopter aboardship with launch imminent.

a. Accomplish parking checklist.

b. Tie helicopter down.

TYPE 3

Same as Unattended Stowage, Land, Seg. 2.1.3.1.1, Type 4.

SO WHAT

M.C.S.

C.E.A.

TESTING:

AUTHORED BY DATE

REVIEWED BY DATE

Attachment (I)

1. Launch not imminent, 25 to 65 kts.

   a. Parking checklist.

   b. Helicopter tied down.

   c. Blades spread and booted

2. Launch imminent.

   a. Parking checklist

   b. Shipboard prelaunch tie down.

3. Unattended stowage, any wind condition.

   Same as land based seg. 2.1.3.1.1.

PRELIMINARY AUTHOR'S SCRIPT

SECTION 1 :
UNIT 1 :
LESSON 3 : Aircraft handling
SEGMENT 4 : 2.1.3.1.1.2

OBJECTIVE: Given an SH2F aboard ship, demonstrate the procedures for stowage under all conditions in accordance with NAVAIR 01-260HCD-2-1 and NAVAIR 01-260HCD-1.

INTRODUCTION: As a plane captain, you will be required to stow your helo under any given condition, such as heavy weather, maneuvering, etc. One of the following procedures will cover any condition you may come up against.

GENERALITY: The procedure for stowing an SH2F under any given condition aboard ship is:

1. Launch not imminent, complete:
   a. Parking checklist, b. helicoptor tie down, c. blades spread & booted.
2. Launch imminent, complete:
   a. Parking checklist, b. helicopter tie down.
3. Unattended stowage, under all conditions, complete:
   a. Parking checklist, b. helicopter tie down, c. fold main rotor blades, d. fold tail rotor blades.

STORYBOARD

Excerpts from previous film on using a tie down and tying a helo down.	Along with knowing how to use the tie down properly and knowing how to tie down a helo, you must also know. -----
	the proper stowage procedure for any given condition. This includes such things as stowing for launch or for heavy maintance
Need print of generality	The procedure for stowing an SH2F under any given condition aboard ship is:
need shot of generality, Then show helo properly secured for this list	1. launch not immenent, complete: a. parking check list b. helicopter tiedown c. blades spread and booted
same as above	2. launch immenent, complete: a. Parking checklist b. shipboard pre launch tie down.

STORYBOARD

same as the other 2	3 Unattended stowage under all conditions, complete: a. parking checklist b. helicopter tie down c. Fold main rotor blades d. Fold tail rotor blades.
Again show entire generality	These are the 3 types of stowage you will be using aboard ship. Now lets look at each one.
Picture of unsecured helo	First, if you arent planning to launch immediately you will accomplish the following:
Start here showing a person doing each item on checklist as described	1. Parking checklist. This consists of checking or doing the following things: a. Landing gear pins - installed in RH & LH MLG. (Main landing gear)
↓	b. Auxillary fuel tank safety pins - installed in RH & LH tank

STORYBOARD

Continue with parking check list sequence

c. Sono bouy launcher ground safety pin - installed

SONOBOUY launcher

d. Main rotor blade - 450 position

e. Rotor brake on

f. Parking brakes - on, "T" handle up.

HANDLE

Insure this shows centering tail wheel & checking for lock pin in.

g. Tailwheel - centered and locked.

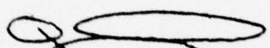
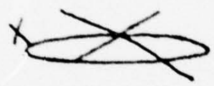
STORYBOARD

Show person checking placement of chocks.	e. chocks - in place
Show helo without tie downs and start here showing tie down of helo	The next item is complete helicopter tie down. This is done in this manner:
install tie downs on 1 main landing gear in proper manner	1. Two tie downs on each MLG at 90° to each other along the helo's center line.
show as described with person installing tie down	2. Two tie downs on each fuselage tie down ring at 45° to each other along the helo's center line.
show as described with person installing tie down	3. Two tail tie downs opposing each other along the helo's center line

A FINAL-DRAFT SCRIPTWRITER'S SCRIPT

SEGMENT NO: 1.1.3.4 TITLE: SH2F STOWAGE AT SEA

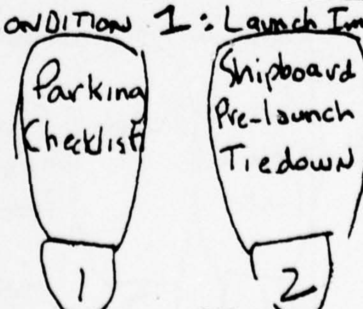
AUTHOR: Carrick

AUDIO	VIDEO	REMARKS
As a plane captain at sea, you will be required to stow your helicoptor in accordance with prevailing conditions. There are three prescribed SH2F shipboard stowage procedures, which enable you to secure your aircraft properly to meet any conditions you may encounter at sea.	STOCK FOOTAGE OF HELOS AT SEA, TAKE OFFS, LANDINGS AND TIE DOWNS.	
The objective of this lesson is to describe the SH2F shipboard stowage procedures, and identify the three conditions under which those procedures are carried out.	 LAUNCH IMMINENT  LAUNCH NOT IMMINENT  UNATTENDED STOWAGE	
At sea, at any given time, your helicopter must be secured to meet one of these three conditions:		
Condition One: Launch Imminent.	CONDITION 1: Launch IMMINENT	

SEGMENT NO: ______________ TITLE: ______________

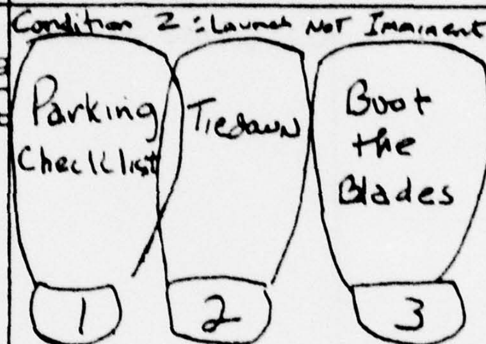
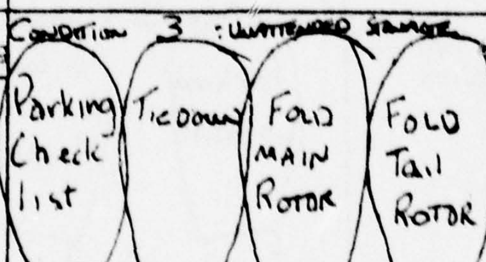
AUTHOR: ______________

AUDIO	VIDEO	REMARKS
Condition Two: Launch Not Imminent.	CONDITION 2: Launch NOT Imminent	
Condition Three: Unattended Stowage.	CONDITION 3: Unattended Stowage	
Condition One, Launch Imminent, involves two steps:	Condition 1: Launch Imminent	START WITH THIS.
Step One -- the parking check list, and Step Two -- the shipboard pre-launch tiedown.	CONDITION 1: Launch Imminent	then show first shoe, then the second shoe. THUMP-THUMP!



SEGMENT NO: ______________ **TITLE:** ______________

AUTHOR: ______________

<table>
<tr><th>AUDIO</th><th>VIDEO</th><th>REMARKS</th></tr>
<tr><td>Condition Two, Launch Not Imminent, involves three steps:</td><td>Condition 2: Launch Not Imminent</td><td>Start with this...</td></tr>
<tr><td>Step One -- the parking check list, Step Two -- tie-down, and Step Three -- boot the blades.</td><td>
</td><td>then show first shoe, then second, then third shoe.
THUMP-THUMP-TH</td></tr>
<tr><td>Condition Three, Unattended Stowage, involves four steps:</td><td>CONDITION 3: UNATTENDED STOWAGE</td><td>Start with this...</td></tr>
<tr><td>Step One -- the parking check list, Step Two -- tie-down, Step Three -- fold main rotor blades and Step Four -- fold tail rotor blades.</td><td>
</td><td>Then show first shoe, then second, then third, then fourth
THUMP-THUMP-THUMP-
THUMP!</td></tr>
</table>

SEGMENT NO: ____________ TITLE: ____________

AUTHOR: ____________

AUDIO	VIDEO	REMARKS
These are the three shipboard stowage conditions and the steps involved in each. Now let's look at them in detail:	CONDITION 1: Launch Imminent CONDITION 2: Launch NOT Imminent CONDITION 3: Unattended Stowage	
Condition One -- Launch Imminent.	CONDITION 1 : Launch Imminent	Start with this...
If launch is imminent, the aircraft stowage procedure involves two steps: Step One -- the parking check list and Step Two -- shipboard pre-launch tiedown.	CONDITION 1 : LAUNCH IMMINENT 	Then show first shoe, then the second shoe. THUMP - THUMP!
Step One -- the parking check list for Condition One goes like this:	CONDITION 1 : LAUNCH IMMINENT 	

SEGMENT NO: ____________ TITLE: ____________

AUTHOR: ____________

AUDIO	VIDEO	REMARKS
Pins	Show a man installing the landing gear pins in the right and left landing gear.	These next 8 frames should move fast: PINS-PINS-PINS-ROTOR-BRAKE-BRAKE-LOCK+CHOCK! BANG BANG BANG IMPAC
Pins	Show a man installing the auxillary fuel tank safety pins in right and left auxillary tanks	
Pins	Show a man installing Sonobuoy launcher ground safety pin.	
Rotor	Show a man positioning main rotor at 45° angle	

SEGMENT NO: ________ TITLE: ________

AUTHOR: ________

AUDIO	VIDEO	REMARKS
Brake	Show a man engaging the rotor brake.	
Brake	Show a man engaging the parking brake, pushing the "T" handle up.	
Lock	Show a man locking the tail wheel.	
And chock.	Show a man putting wheel chocks in place.	

SEGMENT NO: ____________ TITLE: ____________

AUTHOR: ____________

AUDIO	VIDEO	REMARKS
Or...	"OR..."	
Install the landing gear pins in the right and left main landing gear.	Show a man installing landing gear pins.	Slower now, giving student time to absorb each step.
Install the auxillary fuel tank safety pins in the right and left auxillary fuel tanks.	Show a man installing auxillary fuel tank safety pins	
Install the Sonobuoy launcher ground safety pin.	Show a man installing Sonobuoy ground safety pin	

SEGMENT NO: ________ **TITLE:** ________

AUTHOR: ________

AUDIO	VIDEO	REMARKS
Position the main rotor blades at a 45 degree angle from the center line of the aircraft.	Show it	
Apply the rotor brake.	Show it	
Apply the parking brake ("T" handle up).	Show it	
Center and lock the tail wheel.	Show it	

SEGMENT NO: ____________ TITLE: ____________

AUTHOR: ____________

AUDIO	VIDEO	REMARKS
And put the wheel chocks in place.	Show it.	
Step Two -- the shipboard pre-launch tiedown for Condition One is as follows:	Condition 1: Launch Imminent Shipboard Pre launch Tiedown 2	
Attach four outboard tiedowns, two to each main landing gear. Position them at right angles to each other and at a 45 degree angle from the aircraft's center line.	Show film of SH2F with tiedowns OR DIAGRAM it	
Attach two tail tiedowns, one on each side of the tail, with no greater than a 15 degree tolerance to a line perpendicular to the center line of the aircraft.	Film or Diagram	

Appendix E

CAI PRODUCTION

INTERMEDIATE CAI PRODUCTS DURING PRODUCTION

Contents

LESSON SPECIFICATION DOCUMENT

SECTION NO: XIII UNIT NO: 2 LESSON NO: 1 SEGMENT NO: 2.2.1.7.2.1

BEHAVIOR/CONTENT: CLASSIFICATION [X] PROCEDURAL [ ] RULE [ ]

LESSON TITLE: Classification

OBJECTIVE: Given an operational ASQ-81 MAD system and a target detectable by MAD, identify a true MAD submarine signal each time signal is gained.

MEDIA: WORKBOOK [ ] T/S [ ] V/T [ ] CAI [X] TRAINER [ ]

GENERALITY:

A true MAD submarine signal is identified by the following critical attributes:

1. The first peak of a true submarine signal will not break sharply from the center line, but will begin gradually.

2. The duration of a submarine signal usually will not be less than 1 sec. nor more than 7 sec.

3. A true submarine signal will never have more than 5 peaks nor less than 2.

ALGORITHM:

4. Under conditions of normal noise level, the trace of the submarine signal will be free from irregularities.

SPECIAL TEACHING POINTS:

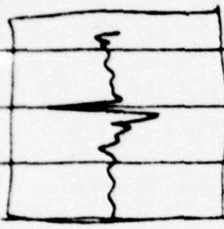
INSTANCE SPECS*

TYPE I

DESCRIPTION: Examples with varying number of peaks from one peak to seven or more. Examples will be those with 2 to 5 peaks. Non-examples will be all others.

NO. EXAMPLES 6 NO. PRACTICE 6 NO. TEST 6

SAMPLE ITEM:



"This is a valid/invalid MAD signal.

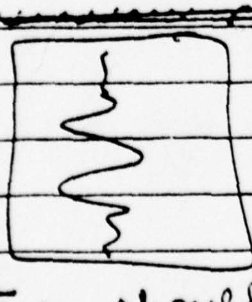
Help: "Because it has ___ peaks."

TYPE II

DESCRIPTION: Examples with varying times of duration from one second to thirty or more seconds. Examples will be those from 3 to 25 seconds long. Non-examples will be all others.

NO. EXAMPLES 6 NO. PRACTICE 6 NO. TEST 6

SAMPLE ITEM:



"This is a valid/invalid MAD signal."

Help: Because it has ___ seconds duration."

*Types should be intermixed so that an example is a type I and a type II at the same time, and so forth. Otherwise the total number of examples will be overwhelming.

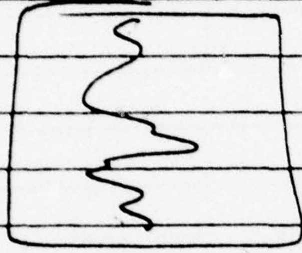
INSTANCE SPECS

TYPE ~~II~~ III

DESCRIPTION: Examples with varied gradualness of the break from centerline. Examples should be those which break gradually. Non-examples should show a sharp, angular break from center

NO. EXAMPLES ~~5~~ 6 NO. PRACTICE ~~5~~ 6 NO. TEST 6

SAMPLE ITEM:



"This is a valid/invalid MAD signal"

Help: "Because it makes a gradual/sharp break from the centerline."

TYPE ~~II~~ IV

DESCRIPTION: Examples with irregularities of line in various locations and to various extents. Examples will have no irregularities. Non-examples will contain irregularities.

NO. EXAMPLES ~~5~~ 6 NO. PRACTICE ~~5~~ 6 NO. TEST 6

SAMPLE ITEM:

"This is a valid/invalid MAD signal."

Help: "Because it does/does not contain irregularities."

SO WHAT

M.C.S. 3 of each type

C.E.A. Concentrate on examples and nonexamples which have gradual break problems and peak number problems. Also include examples and nonexamples both which run off the edge of the paper.

TESTING: Minimum 3 of each type

AUTHORED BY J. P. Donner DATE Dec 10

REVIEWED BY DATE

INITIAL SEGMENT DRAFT DISPLAYS

SECTION 13 :
UNIT 2 :
LESSON 1 : MAD Classification
SEGMENT 2 :

OBJECTIVE: Given an operational ASQ-81 MAD system and a target detectable by MAD, identify a true MAD submarine signal each time signal is gained.

INTRODUCTION: Classifying as submarine from a Magnetic Anomaly Detection system is a difficult job. You have memorized the rules of MAD; now you will learn how to recognize and apply this rule to a MAD trace.

GENERALITY: A true MAD submarine signal is identified by the following critical attibutes:

1. The first peak of a true submarine signal will not break sharply from the center line, but will begin gradually.
2. The duration of a submarine signal usually will not be less than 1 second nor more than 7 seconds.
3. A true submarine signal will never have more than 5 peaks nor less than 2.
4. Under conditions of normal noise level, the trace of the submarine signal will be free from irregularities.

A true MAD submarine signal is identified by the following critical attributes:

FILE 5.13.2.1.2
FUNCTION Generality
PAGE 1 OF 5

1. The first peak of a true submarine signal will NOT break sharply from the center line, but will begin gradually.

FILE 5.13.2.1.2
FUNCTION Gen
PAGE 2 OF 5

2. The duration of a submarine signal usually will NOT be less than 1 second, nor more than 7 seconds.

FILE 5.13.2.1.2

FUNCTION Gen.

PAGE 3 OF 3

3. A true submarine signal will never have more than 5 peaks, nor less than 2.

FILE 5.13.2.1.2
FUNCTION Gen.
PAGE 4 OF 5

4. Under conditions of normal noise level, the trace of the submarine signal will be free from irregularities.

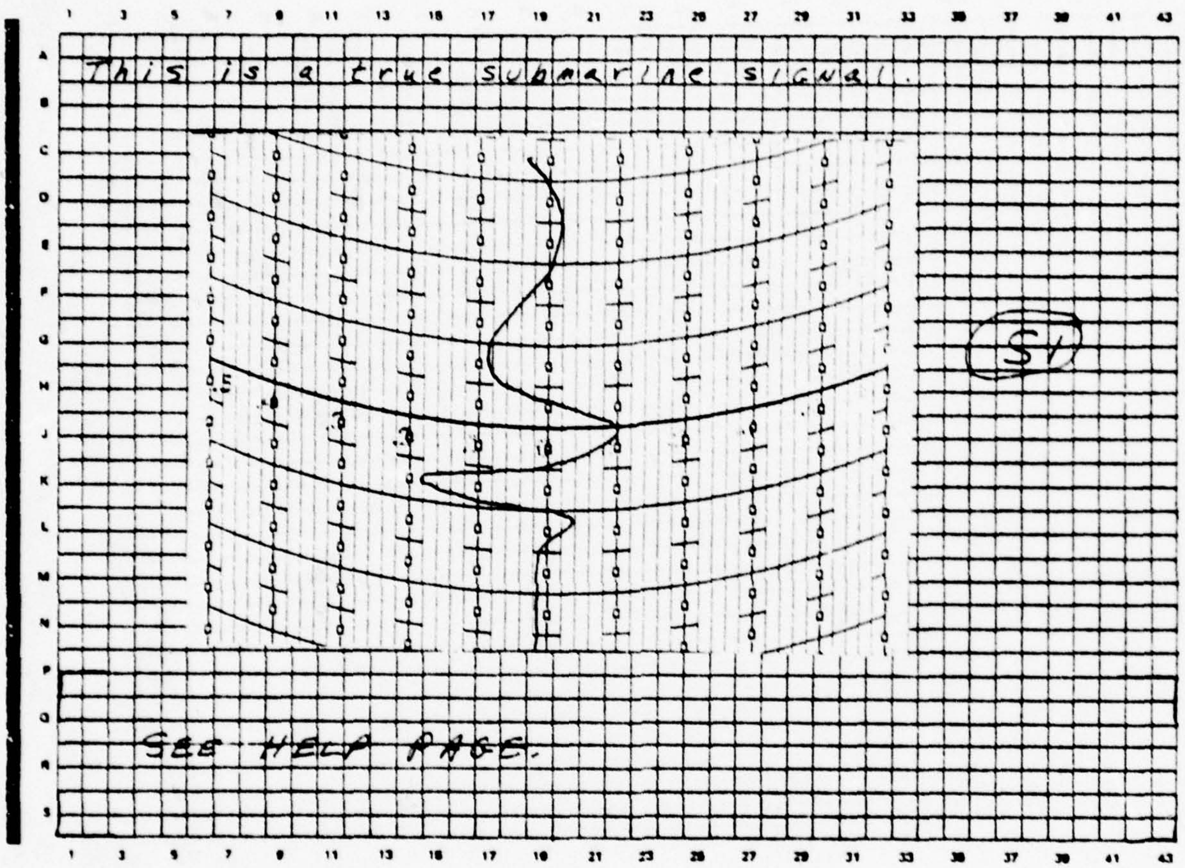
FILE 5.13.2.1.2
FUNCTION Gen
PAGE 5 OF 5

A true MAD submarine signal is identified by the following critical attributes.

FILE S.13.2.1.2

FUNCTION GH

PAGE 1 OF 5



FILE 5.13.2.1.2
FUNCTION EXAMPLE
PAGE 1 OF 1

line A may read: if S2 = No

TYPE I This is NOT a true submarine signal.

Is this a true submarine signal?

S1

Type in Y for yes, N for no: R

FILE 5.13.2.1.2

FUNCTION

PAGE ______ OF ______

Move line N up 1 line.

CEA and Feedback

1. Correct Answer -- Yes, you are right, correct, etc. Use items now on computer.

2. Wrong Answer -- No, this is (if S2=no; is no) a true submarine signal. Enter "help" for assistance.

(or is not) S2 = no

This is a true submarine signal.

S1

Remember that a true submarine signal has:
1. a gradual breakaway
2. a duration of 1 to 7 seconds
3. two to five peaks
4. no irregularities

FILE 5.13.2.1.2
FUNCTION HELP
PAGE 1 OF 5, S4

S2 = yes

if S2=no (is NOT)

This is a true submarine signal.

S5 - graphic from S1
w/breakaway in
green

This trace has a gradual breakaway. So, if it has all the other characteristics, it is a true submarine signal.

if S4 ≠ 2

if S4 = 2 - This trace does NOT have a gradual breakaway. Therefore it is NOT a true submarine signal.

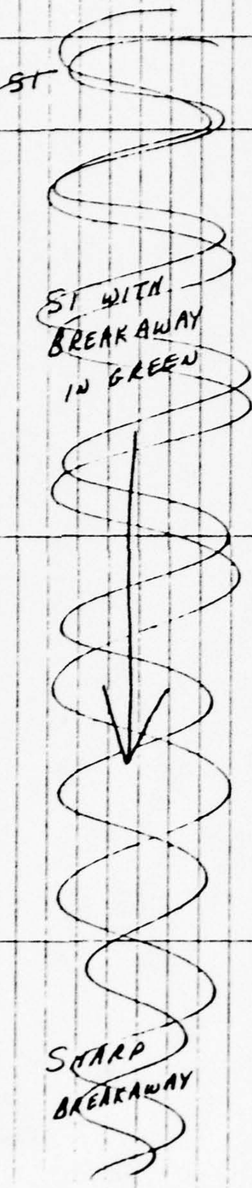
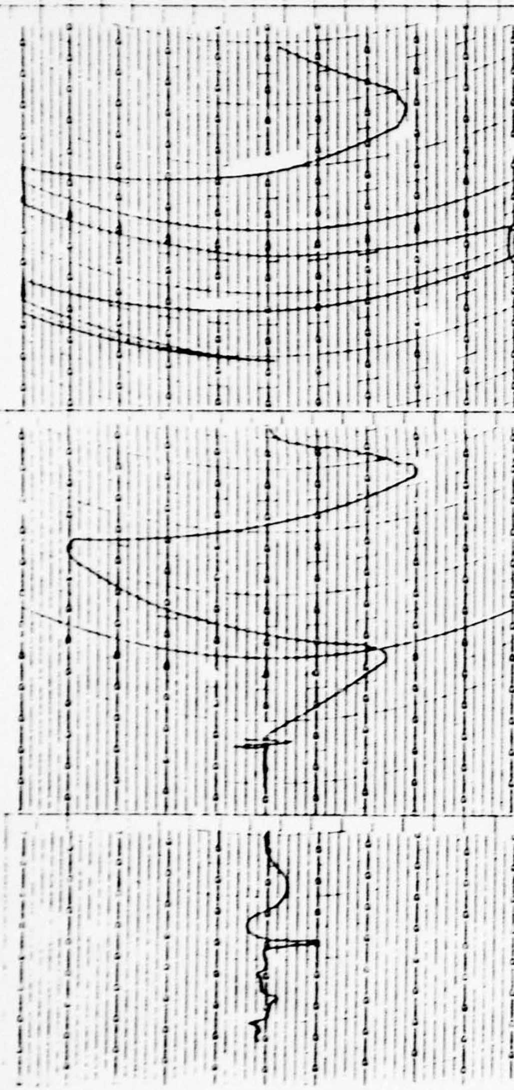
FILE

FUNCTION HELP

PAGE 2 OF S4

INITIAL SEGMENT DRAFT ITEM TABLE

55

Items ↓	S1 - ALL BLK S3 · BREAKAWAY S6 - DURATION S7 · PEAKS S9 · IRREGULARITIES	S99	DOW X = 2 or 3	↓ S4 # OF PS in H	S5 DURATION IN SEC	S8 # OF PEAKS
1E	SEE GRID SHEETS	1 YES	ST 	5		
2E		2 YES	ST WITH BREAKAWAY IN GREEN	5	NULL	NULL
3E		2 NO		3	35 SEC	NULL
4E		2 NO	SHARP BREAKAWAY	2	NULL	NULL

INITIAL SEGMENT DRAFT PACKAGING FORMS

LABEL: S.13.2.1.2 .D/C (Display Specs/Contents Summary)

I. Divergency Indices: IE (Easy): 11, IM (Med.): ____, IH (Hard): ____

II. Does Q have VARIABLE NUMBER OF PARTS? If so, what state variable supplies the correct number of parts?

S____

III. Indicate below the NUMBER OF PAGES and any STATE VARIABLES used to vary the number of pages for the functions listed below.

	PGS.,	STATE		PGS.,	STATE		PGS.,	STATE
X	1	S	XH	5	S 4			
Q1	1	S	H1		S	F1	1	S
Q2		S	H2		S	F2		S
Q3		S	H3		S	F3		S
Q4		S	H4		S	F4		S
Q5		S	H5		S	F5		S
Q6		S	H6		S	F6		S
Q7		S	H7		S	F7		S
Q8		S	H8		S	F8		S
Q9		S	H9		S	F9		S

File S.13.2.1.2

Function X

DISPLAY SPECIFICATIONS

Page 1 of 1

1. Before display erase All

2. Time limit ______ seconds. Branch on time-out to: Function ______

Page ______

3. Window data

	If:	Display Win	UL	LR	File	Item	State	Color	Justification
1.	S99=2	ah	a1	a43	B	1			
2.	S99=1	ab			B	2			
3.		ac	b1	143	IG		1		
4.		ad	m1	m43	B	3			
5.		ae	n1	r43	B	4			
6.									
7.									
8.									
9.									
10.									
11.									
12.									

( ) This page has a continuation.

ANSWER ______

RESPONSE TYPE Y

TRANSLATE ______

RESPONSE PROCESSING

FILE S.13.2.1.2.0

FUNCTION R1

PAGE 1 of 1

(If this is true...and if this succeeds...then do all of this..............................!)

Step	Edit	Type	MOD	Test	Match Against	Action	OCC Code	Feedback	Cont.
1		Y					+	1) B	
2		Y					-	2) C,D	

1) Good for you. That is a right answer.

2) No, this is not a live submarine signal.
Press HELP for assistance.

File S.13.2.1.2

Page 1 of 2

BASE FRAME FILE

Item No.		Where Used
1.	This is not a true submarine signal.	
2.	This is a true submarine signal.	
3.	A true submarine signal has:	
4.	1. a gradual breakaway 2. a duration of 1 to 7 seconds 3. two to five peaks and 4. no irregularities.	
5.	Is this a true submarine signal?	
6.	Type in Y for Yes, and N for No:	
7.	Good for you. That is a right answer.	
8.	21 23 No, this is a true submarine signal. Press HELP for assistance.	
yellow 9.	not	
10.	REMEMBER, a true submarine signal has:	
11.	This trace has a gradual breakaway. So far, it is a true submarine signal.	

SAMPLE INSTRUCTION

GIVEN AN ASQ-81 MAD SYSTEM READOUT,
IDENTIFY A VALID MAD SUBMARINE SIGNAL
WHENEVER ONE OCCURS.

FILE
FUNCTION Objective
PAGE 1 OF 1

A VALID SUBMARINE SIGNAL SIGNAL IS
IDENTIFIED BY THE FOLLOWING
CHARACTERISTICS:

1. A SHARP BREAK FROM THE CENTERLINE TO THE FIRST PEAK,
2. A DURATION OF MORE THAN 3 SECONDS BUT LESS THAN 25 SECONDS,
3. AT LEAST 2 PEAKS BUT NOT MORE THAN 5 PEAKS.
4. LACK OF IRREGULARITIES IN THE SIGNAL.

FILE
FUNCTION Generality
PAGE 1 OF 1

THERE IS A SIMPLE CHECKING PROCEDURE YOU CAN FOLLOW TO BE SURE YOU DO NOT MAKE ERRORS WHEN IDENTIFYING THE SIGNALS. FIRST, WAIT UNTIL THE PEN BREAKS AWAY FROM THE CENTERLINE AND COMPLETES ONE PEAK.

APPROPRIATE ILLUSTRATION

FILE
FUNCTION Generality help
PAGE 1 OF 10

LOOK BACK TO THE BEGINNING OF THE SIGNAL AND CHECK FOR A GRADUAL BREAK FROM THE CENTER LINE....

APPROPRIATE ILLUSTRATION

FILE
FUNCTION Generality help
PAGE 2 OF 10

AS OPPOSED TO A SHARP BREAK.

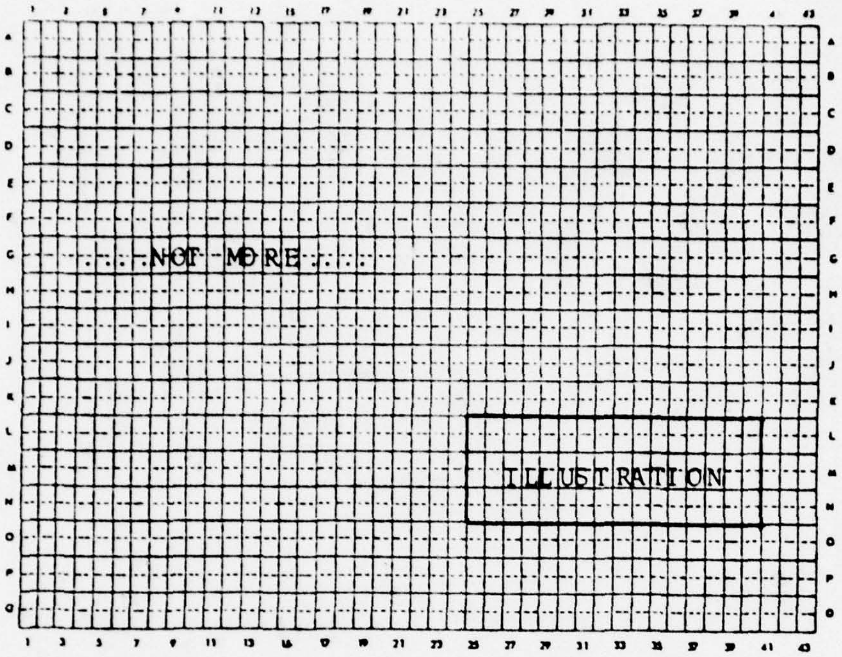
APPROPRIATE ILLUSTRATION

FILE
FUNCTION Generality help
PAGE 3 OF 10

NEXT, WAIT UNTIL THE PEN DEFLECTIONS RETURN TO THE NORMAL NOISE LEVELS ALONG THE CENTERLINE. COUNT THE NUMBER OF PEAKS. NOTICE SOME PEAKS HAVE VERY SLIGHT DEVIATIONS FROM THE CENTERLINE. THERE SHOULD BE BETWEEN 2 AND 5 PEAKS.

APPROPRIATE ILLUSTRATION

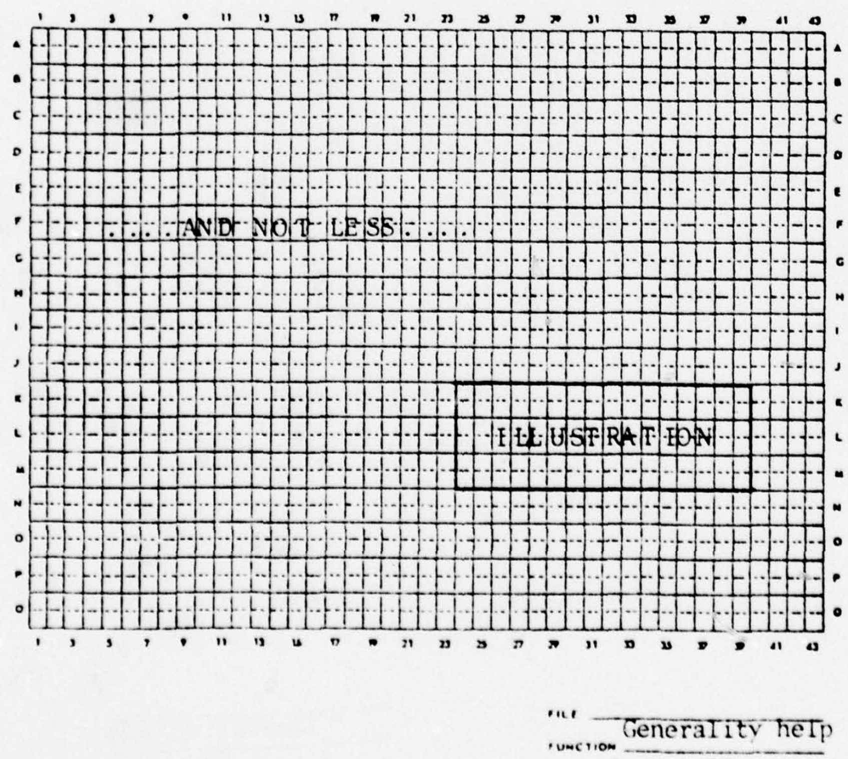
FILE
FUNCTION Generality help
PAGE 4 OF 10



FILE ______

FUNCTION Generality help

PAGE 5 OF 10



FILE ______

FUNCTION Generality help

PAGE 6 OF 10

NEXT, DETERMINE THE DURATION OF THE SIGNAL TRACE. THE DURATION OF THE TRACE MUST BE BETWEEN THREE AND 25 SECONDS, MEASURED FROM THE GRADUAL BREAK TO THE POINT WHERE THE PEN DEFLECTIONS RETURN TO THE NORMAL NOISE LEVEL, FOR IT TO BE A VALID MAD SIGNAL.

ILLUSTRATION

FILE

FUNCTION Generality help

PAGE 7 OF 10

. . . NOT MORE . . .

ILLUSTRATION

FILE

FUNCTION Generality help

PAGE 8 OF 10

. . . AND NOT LESS. . . .

ILLUSTRATION

FILE

FUNCTION Generality help

PAGE 9 OF 10

FINALLY CHECK TO SEE THAT, FROM THE
GRADUAL BREAK TO THE LAST PEAK, THE MAD
SIGNAL TRACE IS SMOOTH AND FREE FROM
IRREGULARITIES. THE SIGNAL BELOW CONTAINS
IRREGULARITIES AT POINTS A, B, AND C.

ILLUSTRATION

FILE

FUNCTION Generality help

PAGE 10 OF 10

HERE ARE TWO MAD SIGNALS. THE ONE ON THE LEFT IS A VALID MAD SIGNAL; THE ONE ON THE RIGHT IS NOT.

APPROPRIATE ILLUSTRATION

APPROPRIATE ILLUSTRATION

FILE

FUNCTION Example

PAGE 1 OF

APPLY THE TEST TO THEM:

THE SIGNAL ON THE LEFT HAS NO IRREGULARITIES AND HAS ALL THE OTHER CHARACTERISTICS OF A VALID MAD SIGNAL.

FILE

FUNCTION Example help

PAGE 1 OF

APPLY THE TEST TO THEM:

ON THE RIGHT IS A SIGNAL
WITH AN APPROPRIATE
NUMBER OF PEAKS, A
PROPER DURATION, AND A
GRADUAL BREAK. BUT THE
IRREGULARITIE IN THE
SIGNAL DISQUALIFY IT
FROM BEING A VALID MAD
SIGNAL.

APPROPRIATE
ILLUSTRATION

FILE
FUNCTION Example help
PAGE 2 OF

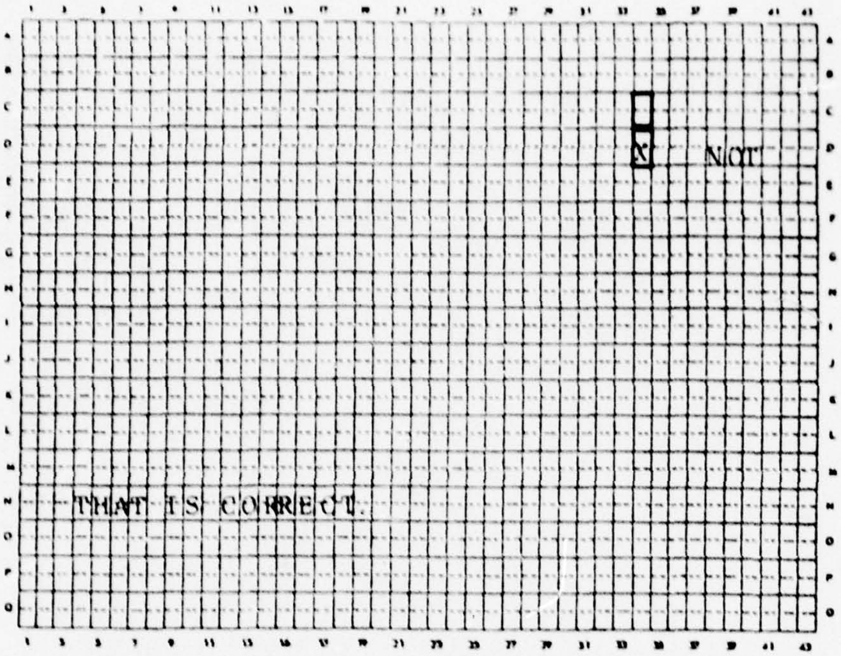
(Examples of this type and format are created to cover a broad range of characteristics and combinations. They are made available to the student only on demand.)

DECIDE WHETHER THE MAD SIGNAL BELOW IS
VALID OR NOT. ENTER YOUR ANSWER.

☐ VALID
☐ NOT

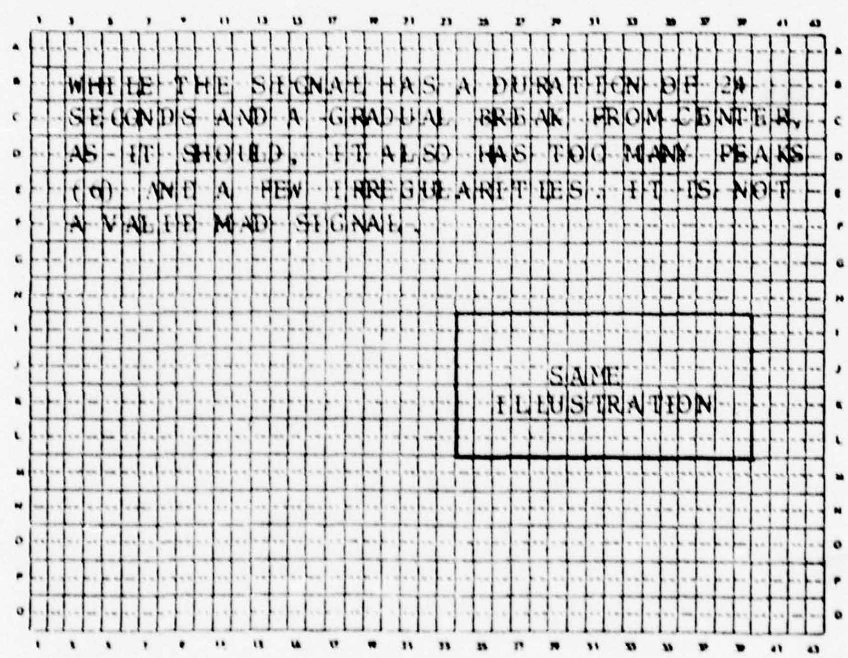
APPROPRIATE
ILLUSTRATION

FILE
FUNCTION Practice
PAGE 1 OF 1



To same display as above, add this:

FILE Practice-Positive Feedback
FUNCTION
PAGE 1 OF 1



FILE Practice help
FUNCTION
PAGE 1 OF 1

(Practice items and test items of this same form are created to cover a broad range of characteristics and combinations. They are made available to the student only on demand.)

Appendix F

SMALL-GROUP EVALUATION DATA

**DATA COLLECTED DURING
SMALL-GROUP TRYOUT OF
INSTRUCTIONAL MATERIALS**

4.0 DETAILED REPORT

The below data were obtained for segments tried out during this month.

SEGMENT NO.	SEGMENT TITLE	MEDIUM		PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	Before Starting Engines Checklist	WB		36	34	36	36	36	35					
	Emergency Pump Caution Light	T/S		2	2	2	2	2						
	Maximum Gross Weight Take Off	WB		7	7	7	7	7						
	Oceanography Phase Angle	RA		8	7/8	7/8								

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		DATE
	LN-66 Radar T/S	WB	5	Y 4	Y 4	Y 5	N 3					Ø	X	X		7/30
	ARR-52-Poststart (Redo & Re-eval)	WB														
	MAD T/S Unit 1	WB	4	4 Y	3½ Y	4 Y	4 Y					Ø	Ø	Ø		7/30
	MAD T/S Unit 3	WB	6	Y 4	Y 6	Y 5	Y 5					Ø	X	Ø		
	MAD T/S Unit 2	WB	4	N 3	N 3	N 3	Y 3½					Ø	X	X		
	Emergency Kit	WB	3	Y 3	Y 3	Y 3	Y 3					Ø	X	Ø		
	Prelanding Checklist	WB														
	Swimmer Signals	T/S	10	Y 10	Y 10	Y 10	Y 10					Ø	X	X		7/30
	AKT-22 Set up Hour, Minute	WB	5	Y 2	Y 2	Y 5	Y 5					Ø	X	X		7/30
	Single Engine Failure		14	Y 10	Y 12	Y 10						Ø	X	Ø		8/5
	Blade Stall		7	Y 7	Y 7	Y 6						Ø	Ø	Ø		8/5
	Tail Wheel Lock Fail		2	N 1	Y 2	Y 2						Ø	Ø	Ø		8/5
	RAI Malfunction		5	Y 5	Y 5	Y 5						Ø	Ø	Ø		8/5
	Fuel Transfer Caution Light		7	N 5	Y 6	Y 6						Ø	X	Ø		8/5
	Speed Decrease Gearbox Malf.		7	N 6	Y 7							Ø	Ø	X		8/25
	Cabin Fire		7	Y 7	Y 7							Ø	X	X		8/25
	Hoist Stoppage		7	Y 6	Y 7							Ø	X	X		8/25
	Decaying Nr/Nf															

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		DATE
	Radar Alt. Failure		7	N 7	Y 7							Ø	X	X		
	Ext. Eng. Fire		8	Y 7	Y 8							Ø	X	X		
	NATO Mil-Spec	WB	13	Y 11	Y 11	Y 9						Ø	X	X		8/12
	HHER Brief	H O	D													8/12
	ICS - Hoist Rigging		3	Y 3	Y 3	Y 3						Ø	X	Ø		8/12
	Annotation	WB	10	Y 10	Y 10	Y 10						Ø	X	X		8/12
	ASA - 26 Troubleshooting		15	10	15							Ø	Ø	X		8/12
	Hoist Malfunction	WB	7	Y $5\frac{1}{2}$	Y 6							Ø	X	X		8/30
	Restart Checklist		NMR									Ø	X	X		8/30
	Taxiing/Post Launch Chklist		5	4	5	$3\frac{2}{3}$						Ø	Ø	X		8/30
	Passenger Brief		3	Y 3	Y 3	Y 3						Ø				8/30
	Aircraft Stat. (Yellow Sheet)		7	Y 6	Y 7	Y $5\frac{1}{2}$						Ø	X	Ø		8/30
	MAD Annotation		9	Y 8	Y 9	Y 9						Ø				8/30
	Runway Hoist		3	N 2	Y 3	Y 3						Ø	X	X		8/30
	Post T/O Checklist		6	N 2	N 3	N 2						X	X	X		8/30
	Hoist Brief															
	Bandpass Adj. Del. Search		2	Y 2	N 0	Y 2						Ø	X	X		8/30
	Aircrew Brief		15	10	Y 12	Y 11						Ø	X	Ø		8/30

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		DATE
	Secure Cargo Internally		5	Y 5	Y 4	N 3						Ø	X	Ø		8/30
	Normal Take-Off		7	Y 6	N 5	Y 7						Ø	Ø	X		8/5
	VHF/ADF to a Ship		11	Y 11	N 10	Y 11						Ø	Ø	Ø		8/5
	Leveling w/com. Elec. Fail.		5	N 4	Y 5	Y 5						Ø	Ø	Ø		8/5
	Rustlick Pilot		11	Y 10	Y 9	Y 8						Ø	Ø	X		
	Recover to shp w/out ASE		10	N 6	Y 10							Ø	Ø	X		8/25
	VMC Ship Take-Off		7	Y 7	Y 7							Ø	Ø	Ø		8/25
	Lights Req. Closing Posit.		24	Y 24	Y 22							Ø	Ø	X		8/25
	Running Landing		9	Y 9	Y 8	Y 8						Ø	X	Ø		8/5
	Recovery w/MAD Deployed		18	Y 18	Y 18	Y 18						Ø	Ø	X		8/5
	Approach Planning		10	Y 10	Y 10							Ø	Ø	X		8/25
	SAR Report		8	Y 8	Y 8							Ø	Ø	Ø		8/25
	Landing w/ext. AKT-22		5	Y 5	Y 5							Ø	X	Ø		
	Recovery to shp w/el. mal.		9	6	7½							X	X	X		8/5
	TACAN approach to a ship		8	Y 7	Y 8							Ø	Ø	X		8/27
	System Checklist		14	Y 13	Y 14							Ø	X	X		8/27
	Land Recovery		8	Y 8	Y 8							Ø	Ø	X		8/27
	Emergency RPM Control Appr.		5	Y 5	Y 5							Ø	Ø	Ø		8/27

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		DATE
	Land Takeoff IMC		7	Y 6	Y 7							Ø	Ø	X		8/27
	Lookout Reporting		4	Y 4	Y 4	N 1						Ø	Ø	Ø		8/30
	ICS Technology		16	Y 16	Y 14	Y 16						Ø	Ø	Ø		8/30
	RP-32 Malfunction		14	Y 12	Y 11	Y 14						Ø	X	X		8/30
	Radar Config. Operation															
	Turning on the LN66HP Radar		NMR	n/a	n/a	n/a						Ø	X	X		8/30
	Smoke Release		4	N 2	Y 4	Y 4						Ø	Ø	X		8/30
	Normal Hoisting Operation		9	Y 8	Y 8	Y 8						Ø	Ø	X		8/30
	Cargo Transfer Safety Precaut		10	Y 8	Y 9	N 7						Ø	X	X		8/30
	Total Electric Failure		4	Y 4	N 2	Y 3½						Ø	X	X		8/30
	Sensitivity Check		6	5	6	5						Ø	X	Ø		
	Radar Run		5	N 3	Y 3							Ø	X	X		9/9
	Condition Statements		12	Y 8	Y 8							Ø	Ø	X		9/9
	ICS and Radio Controls		8	Y 6	Y 8							Ø	Ø	X		9/10
	Pass Brief		3	Y 3	Y 3							Ø	X	Ø		
	Monitoring		6	Y 3	Y 4							Ø	X	Ø		9/9
	Passive Configuration		5	5	5	4						Ø	X	Ø		
	Broad Band		4	4	4	4						Ø	X	X		

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		DATE
	ASA - 26 Active Config.		4	4	4	4						Ø	X	X		
	Post Checklist		21	21	20	19						Ø	X	X		
	VFR Charts		3	Y 3	Y 3							Ø	Ø	X		9/9
	Terms		10	10	9½							Ø	Ø	Ø		9/9
	Time on Top		3	Y 3	Y 3							Ø	Ø	X		9/10
	Time on Top		5	Y 5	Y 5							Ø	Ø	X		9/10
	Sono Line Up		6	6	6							Ø	Ø	X		
	V.F.R. Charts		3	Y 3	Y 3							Ø	Ø	X		9/10
	RO 32 Post Start		5	5	5	5						Ø	X	X		
	ARR-52 Post Start		13	13	12	12						Ø	X	X		
	Surface Summary		3	1	2	1						X	X	X		
	Master & Slave Buoys		3	3	3	3						Ø	Ø	Ø		
	Immediate Ditching		3	1	3	3						Ø	X	Ø		
	Cabin/elect. Fire		5	5	5	5						Ø	Ø	Ø		
	Hand Pressure Sigs.		11	4	10	11						Ø	X	X		
	Planned Ditching		4	3½	3	3½						Ø	X	Ø		
	#1 and #2 Generator Malf.		12	Y 11	Y 11	Y 12						Ø	X	X		9/15
	Dual Engine Fail.		8	8	8	8						Ø	X	X		9/15

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		DATE
	Shutdown w/total elec. fail.		4	N 3	Y 3	Y 4						Ø	Ø	Ø		9/10
	Elect. Caused Rotor Overspeed		13	N 8½	Y	N 9						X	X	X		9/10
	Doppler Fail.		6	6	6							Ø	Ø	Ø		9/22
	Ext. Cargo Safety Precautions		7	7	7							Ø	Ø	Ø		9/23
	Power Setting		5	5	5							Ø	X	Ø		9/23
	Full Flane Auto. landing		10	10	10	10						Ø	Ø	Ø		
	Landing Feasibility		8	7	8	8						Ø	Ø	Ø		
	Submarines: classes/missions/ op areas		15	14	12	13						Ø	Ø	Ø		
	Recovery to ship w/lost comm.		3	3	3	3						Ø	Ø	Ø		
	Calculating HIFR Fuel		HOLD													
	Controlling Agency Contact		6	5	6							Ø	Ø	Ø		
	Filling out VIDS		9	9	9							Ø	Ø	Ø		
	Flying during load release		6	6	6							Ø	Ø	Ø		
	Day VMC SAR overload		8	8	8	8						Ø	Ø	Ø		9/15
	SAR Search Pattern Req.		8	8	8	8						Ø	Ø	Ø		9/15
	SAR Approach Pickup, Depart.		6	6	6	6						Ø	Ø	Ø		9/15
	MAX wind for rotor start		12	12	12	12						Ø	Ø	X		9/15
	External Cargo Pickup		8	8	8	8						Ø	Ø	Ø		9/15

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		DATE
	Secured Engine Restart		5	5	5	5						Ø	Ø	Ø		9/15
	Pre HIFR Checklist		7	7	7	7						Ø	Ø	X		9/15
	Yellow sheet		35	35	35	35						Ø	Ø	Ø		9/22
	Cont. Agency CONTACT		SENSO													
	Flying A TACAN ARC		5	5	5	5						Ø	Ø	Ø		9/22
	SAR Manual Climbout		7	7	7							Ø	Ø	X		9/22
	Flying Air to Air Intercepts		6	6	6							Ø	Ø	Ø		9/22
	UHF/ADF NAV.		9	9	9							Ø	Ø	Ø		9/22
	Batt. Start Proced.		10	10	10							Ø		X		9/23
	SAR Mission Feasibility		8	8	8							Ø	Ø	Ø		9/23
	Taxi Procedure		8	NO 4	YES 4							Ø	X	X		9/22
	UHF/ADF Approach		16	12	16	16						Ø	X	X		
	Loss of Comm. Procedures		5	4	5							0	0	0		10/22
	Loss of N_f		12	12	12							0	0	0		10/22
	Recovery Reports		9	9	9							0	0	0		10/22
	Power Calculation		13	13	13							0	0	0		10/22
	ESM Report		T										0			10/28
	Load Release		T										0			10/28

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		
	Jettisoning for single engine		T										0			10/28
	Transmission System OPS		T										0			10/25
	Control Agency Contact		6	6								0	0	0		10/5
	MAD Tracking		T										0			10/28
	INT Cargo Procedures		T										0			10/28
	MAR Performance Take-off		T										0			10/24
	Visual Approach		T										0			10/24
	Rescue Feasibility		T										0			10/24
	Single Engine Airspeed		T										2			10/28
	Data Link		T										0			10/28
	Pre-Doppler Check		4	4								0	0	0		10/22
	PT-429		8	8								0	0	0		10/30
	MAD TRACK Tracking		3	3	3							0	0	0		10/22
	Night IMC Procedure		5	5								0	0	0		10/26
	PT-429		7	7								0	0	0		10/26
	HYD Press. Loss		5	5								0	0	0		10/30
	EXT Cargo		5	5	5	5						0	0	0		10/28
	Converter Failure		6	5								0	0	0		10/19

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		DATE
	ELC Failure		4	4								0	0	0		10/29
	Torque Gauge		7	7								OK	OK	OK		10/26
	Settling with Power		6	6								0	0	0		10/28
	Pickup Points		6	6								0	0	0		10/28
	SAR Search		8	8	8							0	0	0		10/28
	Throttle Power Oscillations		13	13	13							0	0	0		10/28
	26 volt transformer failure		5	5								0	0	0		10/29
	Post Load & Prior to Launch Ord. Ck		T									NA	1	NA		10/29
	Downloading Safing Sonobuoys		T									NA	1	NA		10/29
	Refueling Switches		T									NA	2	NA		10/29
	Survival Brief		T									NA	1	NA		10/29
	RO 114 Spd. Cntrl		T									NA	1	NA		10/29
	Torp Safing		T									NA	0	NA		10/29
	Torp INSP		T									NA	2	NA		10/29
	Ordinance		T									NA	0	NA		10/28
	ORD Control		T									NA	0	NA		10/28
	Visual Search		T									NA	0	NA		10/28
	Debrief		T									NA	0	NA		10/29

Seg.	TITLE	Media	Pt. Poss.	Student Scores								Revise Mast.	Revise Tech.	Revise Form		DATE
				1	2	3	4	5	6	7	8					
	Rig Log		T									NA	0	NA		10/29
	EXT. Location		T									NA	0	NA		10/29
	MLL Config.		T									NA	0	NA		10/29
	Loading		T									NA	0	NA		10/28
	Smoke Safing		T									NA	1	NA		10/29
	Sonobuoy Settings		T									NA	2	NA		10/29
	RO 114 Speed		T									NA	0	NA		10/29
	Yellow Sheet Record		T									NA	0	NA		10/29
	Normal T/O Ship		11	Y 11	Y 11	Y 10						Ø	Ø	X		7/22
	Normal Approach		6	N 4	Y 6	Y 6						Ø	Ø	Ø		
	Internal A/C Fire		5	Y 5	Y 3	Y 4						Ø	Ø	Ø		
	Immediate Ditching		11	Y 10	Y 11	Y 11						Ø	X	X		
	Ship Recovery w/Visual Aid		5	Y 5	Y 5	Y 5						Ø	Ø	X		
	Main G. B. Oil Malf.		10	Y 10	Y 10	Y 10						Ø	Ø	X		
	Electrical Fire		10	Y 10	Y 8	Y 10						Ø	Ø	Ø		
	Engine Flameout		16	Y 14	Y 14	Y 14						Ø	Ø	X		
	Internal Engine Fire		8	Y 8	Y 8		Y 8					Ø	Ø	Ø		7/23
	Controlled Ditching		11	Y 11	Y 11		Y 11					Ø	X	Ø		

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		DATE
	Engine Restart		5	Y 5	Y 5		N 5					Ø	Ø	X		
	Engine Compres-sor Stall		9	Y 9	Y 8		Y 9					Ø	Ø	Ø		
	Droop Stop Failure		7	Y 6	Y 7		Y 7					Ø	Ø	Ø		
	Mad reel/cable cut failure with towed bdy dplyd															
	Running Landing		9	Y 9	N 6		N 6						X	X		
	Ship Recovery w/ Lndg Gear Malf.		6	Y 4	Y 6		N 3					Ø	Ø	X		
	(Red) Fuel Trou-ble Caution Light		4	N 2	N 2		N 2									
	AN-ASQ-81 Trouble Shooting Unit 3		4	Y 4		Y 4	Y 4					Ø	X	X		
	AYK-2 Poststart Check		NMR	-	-	-	-					Ø	Ø	X		
	ASQ-81 Malf. Unit 2		2	Y 2		Y 2	Y 2					Ø	X	X		
	Signature Cards		20	Y 18	Y 18	Y 19						Ø	X	Ø		
	AKT-22 Power Output		6	Y 5	N 4	Y 5						Ø	X	Ø		
	ARR-52 Poststart Check		12	N 5	N 3	N 4						X	X	X		
	Poststart ICS Procedures		5	Y 5	N 4	Y 5						Ø	X	Ø		
	Enging Topping		2	Y 2	Y 2	N 1						Ø	Ø	X		
	Tire Blowout		6	Y 6	Y 5							Ø	Ø	Ø		
	Tail Rotor Binding		5	N 3	Y 5							Ø	Ø	X		
	Landing Gear Fails to Lower		7	Y 7	N 6							Ø	Ø	X		

Seg.	TITLE	Media	Pt. Poss.	Student Scores								Revise Mast.	Revise Tech.	Revise Form		DATE
				1	2	3	4	5	6	7	8					
	ASA - 26 Ops Percentage Atten.											Ø	X	X		
	Double Hookup		5	5	4	5						Ø	X	Ø		
	Hoist Retrieval		4	4	4	4						Ø	Ø	Ø		
	Load Sheet & Sono ejection panel		5	5	5	5						Ø	X			
	Prelanding checklist		14	14	14	14						Ø	X	Ø		
	ASA-26 Poststart		--	--	--	--						Ø	X	X		
	MAD Alignment															
	Percentages		4	4	4							Ø	X	Ø		
	Cargo Brief		7	7	6	6						Ø	X	0		
	Mission Equipped		3	3	3	2						Ø	X	X		
	Ranges		4	4	4	4						Ø	Ø	Ø		
	Effect of Alt. on Ranges		4	4	4							Ø	Ø	X		
	Load Sheet		8	7	8							Ø	X	X		
	Safe An Armed Sonobuoy Load		4	4	4							Ø	Ø	Ø		
	Downloading		4	4	3							Ø	X	Ø		
	VIDS/MAF		8	8	7							Ø	X	Ø		
	Loading		4	4	4							Ø	X	Ø		
	Effects of Attitude on Radar		3	3	2							Ø	X	X		Sept.

Seg.	TITLE	Media	Pt. Poss.	Student Scores 1	2	3	4	5	6	7	8	Revise Mast.	Revise Tech.	Revise Form		DATE
	Loss of Tail Rotor Control		5	Y 5	Y 5							X	Ø	X		
	Fuel Bypass Caution Light		3	Y 3	Y 3							Ø	Ø	X		
	Emergency Pump		2	Y 2	Y 2							Ø	Ø	X		
	Precision Approach			NA	NA							Ø	Ø	X		
	Before and After Landing C.L.		13	Y 13	Y 13							Ø	Ø	Ø		
	Taxi Checklist		7	Y 7	Y 7							Ø	Ø	Ø		
	Starting Rotor Before Taxi Checklist		25	22	19	24						Ø	X	X		
	SAR Brief		4	4	4							Ø	X	Ø		
	Fueling															
	Suction Fueling															
	Gravity Fueling															
	Turnaround Yellow Sheet		12	11	11							Ø	Ø	X		
	Preflight Worksheet		2	1	2							Ø	X	Ø		
	Radar Configuration															
	Kilo Codes		14	14	14							Ø	Ø	X		
	Sonobuoy Launch Tube Loading		4	4	3							Ø	X	Ø		
	Equipment Status		3	3	3							Ø	X	X		
	ICS Procedure for Radar Ground Check		4	4	4							Ø	Ø	Ø		

Seg.	TITLE	Media	Pt. Poss.	Student Scores								Revise Mast.	Revise Tech.	Revise Form		DATE
				1	2	3	4	5	6	7	8					
	Radar/Geographic NAV		3	3	3	3						Ø	Ø	X		
	Config. the ASA - 26		6	6	N 2	6						Ø	Ø	X		
	Distance/Flt. time from VFR Chart		4	2	4							Ø	Ø	Ø		
	Annotations		3	3	3							Ø	X	Ø		

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	CRP 1.1.4 Upright rigging	CAI	1	T										
	CRP 1.1.5 Kingpost	CAI	1	T										
	CRP 1.1.6 Cranes	CAI	1	T										
	CRP 1.1.7 Funnels	CAI	1	T										
	CRP 1.1.8 Masts	CAI	1	T										
	CRP 1.1.9 Stern Types	CAI	1	T										
	CRP 1.2.1 Appearance Group	CAI	1	T										
	CRP 1.2.3 Hull Types	CAI	1	T										
	CRP 1.2.4 Raise Identification	CAI	1	T										
	CRP 1.2.5 Raise Location	CAI	1	T										
	CRP 1.2.6 Long Raise	CAI	1	T										
	CRP 1.2.7 Combination Raise	CAI	1	T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES 1	2	3	4	5	6	7	8	9	10
	CRP 1.3.3 USSR Bombers	CAI	1	T										
	CRP 1.4.4 USSR Surface Vessels	CAI	1	T										
	NA 2.3.2 Time on Top	CAI	1	T										
	CRP 1.3.1 Aircraft Recognition	CAI	1	T										
	CRP 1.3.2 USSR Fighters	CAI	1	T										
	CRP 1.4.2 US Features	CAI	1	T										
	CRP 1.4.3 USSR Features	CAI	1	T										
	CRP 1.4.1 US Surface Ship ID	CAI	1	T										
	CRF 1.1.1 Prelanding Checklist OR 3.1.4 Downloading	WB WB		T T										
	SE 8.4.1 Cargo Hook System OR 2.1.5 Sonobuoy Launch Tube PF 2.1.2 Turnaround In-	WB WB WB		T T T										
	spection AD 2.1.3 Ranges on the ASA-26	WB		T										
	OR 3.1.1 Safing Sonobuoys	WB		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	SE 4.8.1 Planning Flight to Contact	TS		T										
	SU 1.7.6 Pickup Point Designation	TS		T										
	SF 5.3.10 Torque Gauge Malfunction	TS		T										
	SF 5.3.6 Total Electrical Failure SF 4.3.9 Loss of Nf Signal	TS TS		T T										
	SF 4.3.4 Throttle Power Oscillations	TS		T										
	SF 4.3.4 Throttle Power Oscillations SF 1.7.4 Transfer Pump Malfunction	TS TS		T T										
	SF 4.3.3 Engine Flameout	TS		T										
	CRH 2.1.4 HIFR Connecting	TS		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	CRF 1.3.6 ICS Failure CRF 1.3.14 Droop Stop Failure	TS TS		T T										
	AC 1.2.11 Sound Velocity CRH 2.1.6 Electric & Manual Hoist Control	TS TS		T T										
	CRH 2.1.2 Aircraft Positioning	TS		T										
	PF 3.2.4 Aircraft Movement Safety	TS		T										
	CRH 1.4.5 Cargo Rigging Safety	TS		T										
	SU 1.4.6 Mountainous Wind Conditions	TS		T										
	SE 4.9.2 Lost Comms SS 1.3.4 Pilot/AIO Coord	TS		T										
	SE 4.9.3 LAMPS Frequency Circuits	TS		T										
	SF 5.3.7 Transformer Failure	TS		T										
	NA 2.2.5 Alpha Index CRF 1.3.11 Fire, Cabin	TS TS		T T										
	CRF 1.3.9 Fires, Int & Ext Engine	TS		T										
	CRF 1.3.7 Electrical Failure CRF 1.3.5 Bail Out	TS TS		T T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	CRF 1.3.3 Immediate ditching CRF 1.3.4 Planned Ditching	TS TS		T T										
	SF 8.3.1 Environmental System	WB		T										
	SF 1.4.1 Flight Control System SF 1.2.2 Starting Engine Checklist	WB WB		T T										
	SF 1.2.8 Shutdown Checklist	WB		T										
	SI 1.5.3 Mark VI Point to Point	WB		T										
	SS 1.2.1 Recovery Using Ships Radar	WB		T										
	SE 4.7.7 SWAP Reports SU 1.5.7 Determining Fuel	WB WB		T T										
	PU 2.1.1 Confined Area Takeoff	WB		T										
	PU 2.1.2 Max Performance Takeoff	WB		T										
	SU 4.2.3 PreDoppler Check SU 4.2.7 Night IMC Over Water	WB WB		T T										
	SU 1.7.1 Load Release PU 3.1.1 Swimmer Deployment	WB WB		T T										
	SF 5.2.7 Water Takeoff SF 1.3.1 Single Engine Airspeed	WB WB		T T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES 1	2	3	4	5	6	7	8	9	10
	SU 1.3.4 Call Syntax	WB		T										
	SU 1.2.1 Rescue Feasibility	WB		T										
	PF 2.2.2 Gravity Fueling	WB		T										
	PF 2.2.4 Hot Refueling	WB		T										
	PF 2.2.6 Oil System Servicing	WB		T										
	SE 4.1.11 ASMD	WB		T										
	SE 4.1.13 FSM Scouting	WB		T										
	SE 1.2.8 MAD Patterns	WB		T										
	SS 1.3.6 Recovery Report	WB		T										
	SE 1.1.4 Attach Procedure	WB		T										
	CRF 1.5.2 Ext Location	WB		T										
	SF 5.2.7 Single Engine Water To	WB		T										
	CRF 1.5.7 Load Sheet	WB		T										
	SI 1.5.4 PT-429	WB		T										
	SI 1.3.5 Controlling Agency Contact	WB		T										
	SF 1.10.1 Transmission Support	WB		T										
	SF 1.9.1 Fire Detec Spt	WB		T										
	SF 1.8.1 Fuel Spt Opn	WB		T										
	SF 2.11.1 Airframe	WB		T										
	SF 2.10.1 Main Rotor System	WB		T										
	SF 2.9.1 Rotor Brake & Wheel Brake	WB		T										
	SF 4.12.1 LNGG Systems	WB		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES 1	2	3	4	5	6	7	8	9	10
	SF 5.6.1 Comm System	WB		T										
	SF 5.5.1 Lighting Systems	WB		T										
	SF 5.4.1 Electrical System	WB		T										
	SF 7.4.1 ACR-56 System	WB		T										
	SF 7.3.1 MAD System	WB		T										
	SE 4.1.17 Scouting Mission	WB		T										
	SE 4.3.2 Sub Classes	WB		T										
	SU 1.3.9 Counter Battery	WB		T										
	TF 1.1.6 Radar Display	WB		T										
	SF 7.1.2 Recovery with loss of tail rotor	WB		T										
	SE 4.7.6 Off Station Report	WB		T										
	SE 4.7.4 Off Report to Ship	WB		T										
	SE 4.7.5 Onstation Report	WB		T										
	OR 2.1.9 MK84 SUS	WB		T										
	SE 1.3.3 Passive Sono Pattern	WB		T										
	SE 1.2.9 Passive Pattern Expansion	WB		T										
	SE 4.1.15 Radar Scouting	WB		T										
	SE 4.1.16 Visual Scouting	WB		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	PF 2.4.6 Work Area SE 4.7.7 Swap Report	WB WB		T T										
	SE 1.3.13 NGF Spotting Preselected	WB		T										
	SE 4.1.4 ASMD Search SE 1.4.4 Madfactors	WB WB		T T										
	SE 4.1.7 Primary Threat	WB		T										
	SF 1.3.3 Endurance OR 2.1.1 MLM Configurations	WB WB		T T										
	SF 5.1.6 Nohover Single Engine Recovery	WB		T										
	SF 4.1.3 Running Autorotation	WB		T										
	SI 1.2.3 Tacan Approach SE 2.1.8 OTPI Procedure	WB WB		T T										
	SI 1.2.1 Radar Approach SS 1.3.3 VMC Shipboard Recov	WB WB		T T										
	PU 3.1.4 Flying Rescue SE 2.1.2 Trading with PT-429	WB WB		T T										
	PU 3.2.3 Crew Coordination SE 4.9.8 Cargo Brief	WB WB		T T										
	TF 1.1.4 Station Rotor Check	WB		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	SU 1.3.4 NGSF Mission Terms	WB		T										
	SU 1.3.1 Call for Fire SE 4.5.3 Geographic Location	WB WB		T T										
	SU 1.3.11 Detection SE 4.6.1 Debrief	WB WB		T T										
	SE 1.3.6 Active Patterns SU 1.3.12 NGF Spotting	WB WB		T T										
	SE 2.1.9 Passive Tracking	WB		T										
	SE 4.9.10 Intel Brief SU 1.7.1 External Cargo Release	WB WB		T T										
	PU 3.1.1 Swimmer Deployment	WB		T										
	OR 1.1.8 MLM Release Control SI 1.5.5 Nav PT-429	WB WB		T T										
	PU 3.1.2 Loft/10 kt Deployment	WB		T										
	SE 4.8.3 Radar Offset SE 4.1.14 Photo Recon	WB WB		T T										
	SE 2.1.6 Sono Monitoring SE 4.1.5 Search Radar Factors	WB WB		T T										
	SE 1.1.3 Weapon Drop SE 4.9.9 Crew Brief	WB WB		T T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES 1	2	3	4	5	6	7	8	9	10
	SU 4.2.1 Manual Approach	WB		T										
	SE 5.1.1 Little Joe Technique	WB		T										
	AC 1.3.4 Sonobuoy Lineup	WB		T										
	SE 4.6.3 Crew Debrief	WB		T										
	CRP 1.6.4 Visual Search	WB		T										
	SI 1.5.8 Nav Tacan	WB		T										
	AC 3.1.3 Broad Band	WB		T										
	SS 1.2.5 PRA to Ship	WB		T										
	SU 1.5.7 Calculaing HIFR Fuel	WB		T										
	CRH 2.1.8 HIFR Brief	WB		T										
	SF 1.2.3 Normal Start Procedures	WB		T										
	TG 1.1.9 RO-32 Recorder	WB		T										
	CRF 1.1.3 Post Takeoff Checklist	WB		T										
	OR 2.1.2 MLM Loading	WB		T										
	SF 1.1.1 Taxi Procedure	WB		T										
	NA 1.2.3 Calibration of ASO-81	WB		T										
	AC 1.2.4 Annotations during broad band	WB		T										
	OR 3.1.6 Torpedo Safing SE 4.9.11 Mission Overview	WB		T										
	SE 4.9.7 Force Effect	WB		T										
	CRH 2.1.1 Emergency HIFR Breakaway	WB		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	SU 1.2.1 Rescue Landing Feasibility	WB		T										
	SF 5.2.11 Ditching Stations	WB		T										
	CRA 1.2.7 Survival Brief SU 1.5.5 Wind Condition for HIFR	WB WB		T T										
	SU 1.2.8 Submarine Transfer	WB		T										
	TF 1.1.10 ASA 26 Poststart CRF 1.4.7 Vids-MAF	WB WB		T T										
	OR 2.1.11 Sonobuoy Setting	WB		T										
	SI 1.3.2 Alternate Landing	WB		T										
	CRP 1.3.3 USSR Bombers	CAI	1	T										
	CRP 1.4.4 USSR Surface Vessels	CAI	1	T										
	NA 2.3.2 Time on Top	CAI	1	T										
	CRP 1.3.1 Aircraft Recognition	CAI	1	T										
	CRP 1.3.2 USSR Fighters	CAI	1	T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES 1	2	3	4	5	6	7	8	9	10
	CRP 1.4.2 US Features	CAI	1	T										
	CRP 1.4.3 USSR Features	CAI	1	T										
	CRP 1.4.1 US Surface Ship ID	CAI	1	T										
	CRF 1.1.1 Prelanding Checklist OR 3.1.4 Downloading	WB WB		T T										
	SF 8.4.1 Cargo Hook System OR 2.1.5 Sonobuoy Launch Tube PF 2.1.2 Turnaround Inspection	WB WB WB		T T T										
	AD 2.1.3 Ranges on the ASA-26	WB		T										
	OR 3.1.1 Safing Sonobuoys	WB		T										
	CRP 1.1.4 Upright rigging	CAI	1	T										
	CRP 1.1.5 Kingpost	CAI	1	T										
	CRP 1.1.6 Cranes	CAI	1	T										
	CRP 1.1.7 Funnels	CAI	1	T										
	CRP 1.1.8 Masts	CAI	1	T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	CRP 1.1.9 Stern Types	CAI	1	T										
	CR? 1.2.1 Appearance Group	CAI	1	T										
	CRP 1.2.3 Hull Types	CAI	1	T										
	CRP 1.2.4 Raise Identification	CAI	1	T										
	CRP 1.2.5 Raise Location	CAI	1	T										
	CRP 1.2.6 Long Raise	CAI	1	T										
	CRP 1.2.7 Combination Raise	CAI	1	T										
	SE 4.8.1 Planning Flight to Contact	TS		T										
	SU 1.7.6 Pickup Point Designation	TS		T										
	SF 5.3.10 Torque Gauge Malfunction	TS		T										
	SF 5.3.6 Total Electrical Failure SF 4.3.9 Loss of Nf Signal	TS TS		T T										
	SF 4.3.4 Throttle Power Oscillations	TS		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES 1	2	3	4	5	6	7	8	9	10
	SF 4.3.4 Throttle Power Oscillations	TS		T										
	SF 1.7.4 Transfer Pump Malfunction	TS		T										
	SF 4.3.3 Engine Flameout	TS		T										
	CRH 2.1.4 HIFR Connecting	TS		T										
	CRF 1.3.6 ICS Failure	TS		T										
	CRF 1.3.14 Droop Stop Failure	TS		T										
	AD 1.2.11 Sound Velocity	TS		T										
	CRH 2.1.6 Electric & Manual Hoist Control	TS		T										
	CRH 2.1.2 Aircraft Positioning	TS		T										
	PF 3.2.4 Aircraft Movement Safety	TS		T										
	CRH 1.4.5 Cargo Rigging Safety	TS		T										
	SU 1.4.6 Mountainous Wind Conditions	TS		T										
	SE 4.9.2 Lost Comms													
	SS 1.3.4 Pilot/AIO Coord	TS		T										
	SE 4.9.3 LAMPS Frequency Circuits	TS		T										
	SF 5.3.7 Transformer Failure	TS		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES 1	2	3	4	5	6	7	8	9	10
	NA 2.2.5 Alpha Index CRF 1.3.11 Fire, Cabin	TS TS		T T										
	CRF 1.3.9 Fires, Int & Ext Engine	TS		T										
	CRF 1.3.7 Electrical Failure CRF 1.3.5 Bail Out	TS TS		T T										
	CRF 1.3.3 Immediate Ditching CRF 1.3.4 Planned Ditching	TS TS		T T										
	SF 8.3.1 Environmental System	WB		T										
	SF 1.4.1 Flight Control System SF 1.2.2 Starting Engine Checklist	WB WB		T T										
	SF 1.2.8 Shutdown Checklist	WB		T										
	SI 1.5.3 Mark VI Point to Point	WB		T										
	SS 1.2.1 Recovery Using Ships Radar	WB		T										
	SE 4.7.7 SWAP Reports SU 1.5.7 Determining Fuel	WB WB		T T										
	PU 2.1.1 Confined Area Takeoff	WB		T										
	PU 2.1.2 Max Performance Takeoff	WB		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	SU 4.2.3 PreDoppler Check SU 4.2.7 Night IMC Over Water	WB WB		T T										
	SU 1.7.1 Load Release PU 3.1.1 Swimmer Deployment	WB WB		T T										
	SF 5.2.7 Water Takeoff SF 1.3.1 Single Engine Airspeed	WB WB		T T										
	SU 1.3.4 Call Syntax SU 1.2.1 Rescue Feasibility	WB WB		T T										
	PF 2.2.2 Gravity Fueling PF 2.2.4 Hot Refueling PF 2.2.6 Oil System Servicing	WB WB WB		T T T										
	SE 4.1.11 ASMD SE 4.1.13 FSM Scouting	WB WB		T T										
	SE 1.2.8 MAD Patterns SS 1.3.6 Recovery Report	WB WB		T T										
	SE 1.1.4 Attach Procedure CRF 1.5.2 Ext. Location	WB WB		T T										
	SF 5.2.7 Single Engine Water To	WB		T										
	CRF 1.5.7 Load Sheet SI 1.5.4 PT-429	WB WB		T T										
	SI 1.3.5 Controlling Agency Contact	WB		T										
	SF 1.10.1 Transmission Support	WB		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	SF 1.9.1 Fire Detec Spt SF 1.8.1 Fuel Spt Opn	WB WB		T T										
	SF 2.11.1 Airframe SF 2.10.1 Main Rotor System	WB WB		T T										
	SF 2.9.1 Rotor Brake & Wheel Brake SF 4.12.1 LNGG Systems	WB WB		T T										
	SF 5.6.1 Comm System SF 5.5.1 Lighting Systems	WB WB		T T										
	SF 5.4.1 Electrical System SF 7.4.1 ACR-56 System	WB WB		T T										
	SF 7.3.1 MAD System	WB		T										
	SE 4.1.17 Scouting Mission	WB		T										
	SE 4.3.2 Sub Classes SU 1.3.9 Counter Battery	WB WB		T T										
	TF 1.1.6 Radar Display SF 7.1.2 Recovery with loss of tail rotor	WB WB		T T										
	SE 4.7.6 Off Station Report	WB		T										
	SE 4.7.4 Off Report to Ship	WB		T										
	SE 4.7.5 Onstation Report	WB		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES									
					1	2	3	4	5	6	7	8	9	10
	OR 2.1.9 MK84 SUS SE 1.3.3 Passive Sono Pattern	WB WB		T T										
	SE 1.2.9 Passive Pattern Expansion	WB		T										
	SE 4.1.15 Radar Scouting SE 4.1.16 Visual Scouting	WB WB		T T										
	PF 2.4.6 Work Area SE 4.7.7 Swap Report	WB WB		T T										
	SE 1.3.13 NGF Spotting Preselected	WB		T										
	SE 4.1.4 ASMD Search SE 1.4.4 Madfactors	WB WB		T T										
	SE 4.1.7 Primary Threat	WB		T										
	SF 1.3.3 Endurance OR 2.1.1 MLM Configuration	WB WB		T T										
	SF 5.1.6 Nohover Single Engine Recovery	WB		T										
	SF 4.1.3 Running Auto-rotation	WB		T										
	SI 1.2.3 Tacan Approach SE 2.1.8 OTPI Procedure	WB WB		T T										
	SI 1.2.1 Radar Approach SS 1.3.3 VMC Shipboard Recov	WB WB		T T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES 1	2	3	4	5	6	7	8	9	10
	PU 3.1.4 Flying Rescue SE 2.1.2 Trading with PT-429	WB WB		T T										
	PU 3.2.3 Crew Coordination SE 4.9.8 Cargo Brief	WB WB		T T										
	TF 1.1.4 Station Rotor Check	WB		T										
	SU 1.3.4 NGSF Mission Terns	WB		T										
	SU 1.3.1 Call for Fire SE 4.5.3 Geographic Location	WB WB		T T										
	SU 1.3.11 Detection SE 4.6.1 Debrief	WB WB		T T										
	SE 1.3.6 Active Patterns SU 1.3.12 NGF Spotting	WB WB		T T										
	SE 2.1.9 Passive Tracking	WB		T										
	SE 4.9.10 Intel Brief SU 1.7.1 External Cargo Release	WB WB		T T										
	PU 3.1.1 Swimmer Deployment	WB		T										
	OR 1.1.8 MLM Release Control SI 1.5.5 Nav PT-429	WB WB		T T										
	PU 3.1.2 Loft/10 kt Deployment	WB		T										

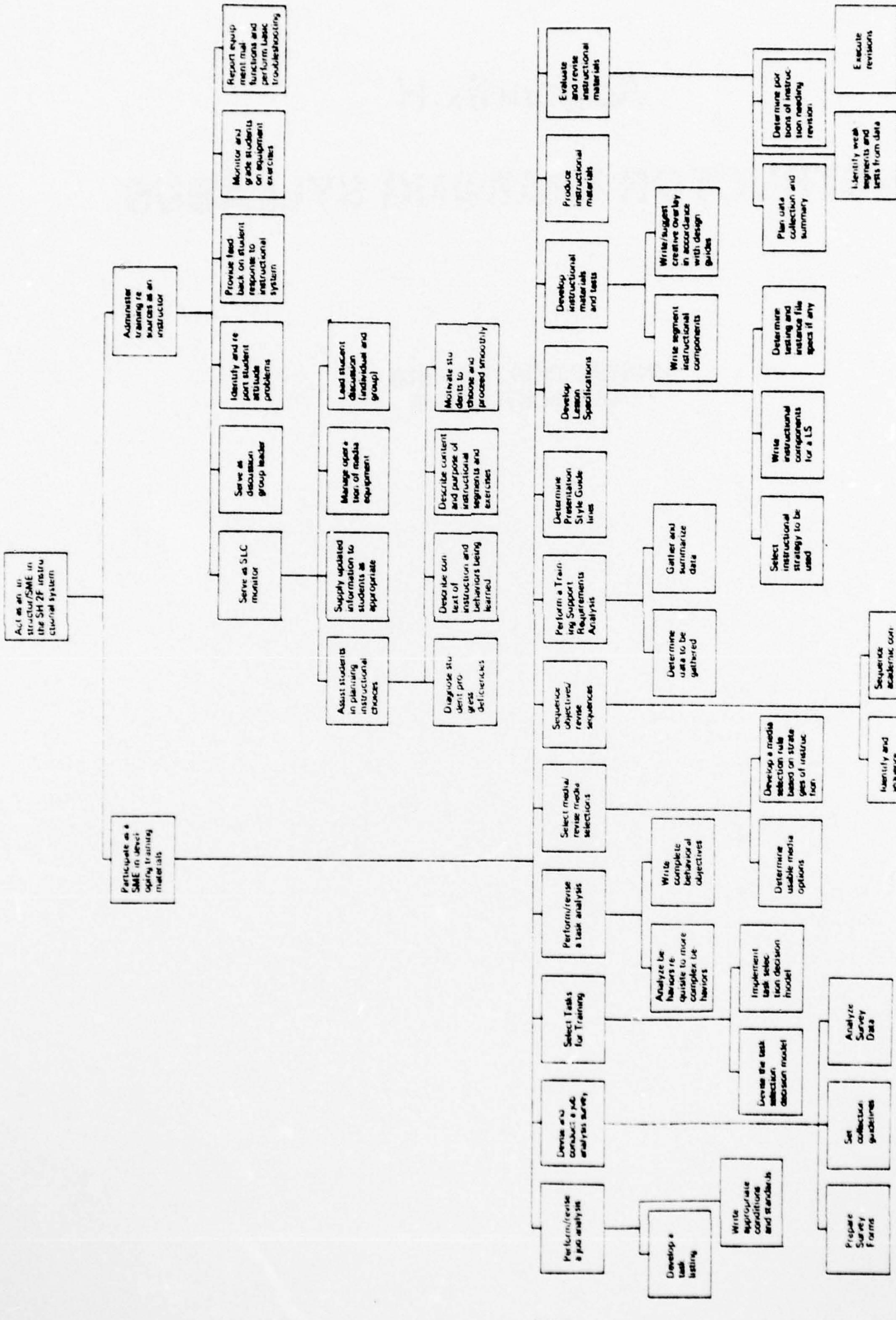
SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES 1	2	3	4	5	6	7	8	9	10
	SE 4.8.3 Radar Offset SE 4.1.14 Photo Recon	WB WB		T T										
	SE 2.1.6 Sono Monitoring SE 4.1.5 Search Radar Factors	WB WB		T T										
	SE 1.1.3 Weapon Drop SE 4.9.9 Crew Brief	WB WB		T T										
	SU 4.2.1 Manual Approach SE 5.1.1 Little Joe Technique	WB WB		T T										
	AC 1.3.4 Sonobuoy Lineup SE 4.6.3 Crew Debrief	WB WB		T T										
	CRP 1.6.4 Visual Search SI 1.5.8 Nav Tacan	WB WB		T T										
	AC 3.1.3 Broad Band SS 1.2.5 PRA to Ship	WB WB		T T										
	SU 1.5.7 Calculating HIFR Fuel CRH 2.1.8 HIFR Brief	WB WB		T T										
	SF 1.2.3 Normal Start Procedures TF 1.1.9 RO-32 Recorder	WB WB		T T										
	CRF 1.1.3 Post Takeoff Checklist	WB		T										
	OR 2.1.2 MLM Loading SF 1.1.1 Taxi Procedure	WB WB		T T										
	NA 1.2.3 Calibration of ASO-81	WB		T										

SEGMENT NO.	SEGMENT TITLE	MEDIUM	NO. OF STUDENTS	PTS POSSIBLE	STUDENT SCORES 1	2	3	4	5	6	7	8	9	10
	AC 1.2.4 Annotations during broad band	WB		T										
	OR 3.1.6 Torpedo Safing SE 4.9.11 Mission Overview	WB WB		T T										
	SE 4.9.7 Force Effect CRH 2.1.1 Emergency HIFR Breakaway	WB WB		T T										
	SU 1.2.1 Rescue Landing Feasibility	WB		T										
	SF 5.2.11 Ditching Stations	WB		T										
	CRA 1.2.7 Survival Brief SU 1.5.5 Wind Condition for HIFR	WB WB		T T										
	SU 1.2.8 Submarine Transfer	WB		T										
	TF 1.1.10 ASA 26 Poststart CRF 1.4.7 Vids-MAF	WB WB		T T										
	OR 2.1.11 Sonobuoy Setting	WB		T										
	SI 1.3.2 Alternate Landing	WB		T										

Appendix G

INSTRUCTOR TASK ANALYSIS

**TASK ANALYSIS OF THE
INSTRUCTOR JOB USED IN INSTRUCTOR
TRAINING COURSE DEVELOPMENT**


Act as an instructor/SME in the SH-2F instructional system
Administer training resources as an instructor
Serve as SLC monitor
Serve as discussion group leader
Identify and report student attitude problems
Provide feedback on student responses to instructional system
Monitor and grade students on equipment exercises
Report equipment malfunctions and perform basic troubleshooting
Assist students in planning instructional choices
Supply updated information to students as appropriate
Manage operation of media equipment
Lead student discussion (individual and group)
Diagnose student progress deficiencies
Describe context of instruction and behaviors being learned
Describe content and purpose of instructional segments and exercises
Motivate students to choose and proceed smoothly
Participate as a SME in developing training materials
Perform/revise a job analysis
Devise and conduct a job analysis survey
Select Tasks for Training
Perform/revise a task analysis
Select media/revise media selections
Sequence objectives/revise sequences
Perform a Training Support Requirements Analysis
Determine Presentation Style Guidelines
Develop Lesson Specifications
Develop instructional materials and tests
Produce instructional materials
Evaluate and revise instructional materials
Develop a task listing
Write appropriate conditions and standards
Prepare Survey Forms
Set collection guidelines
Analyze Survey Data
Devise the task selection decision model
Implement task selection decision model
Analyze behaviors requisite to more complex behaviors
Write complete behavioral objectives
Determine usable media options
Develop a media selection rule based on strategies of instruction
Identify and sequence critical performance tasks
Sequence academic content with reference to performance tasks
Determine data to be gathered
Gather and summarize data
Select instructional strategy to be used
Write instructional components for a LS
Determine testing and instructional file specs if any
Write segment instructional components
Write/suggest creative overlay in accordance with design guides
Plan data collection and summary
Identify weak segments and tests from data
Determine portions of instruction needing revision
Execute revisions

Appendix H

INSTRUCTOR TRAINING SYLLABUS

INSTRUCTOR TRAINING
COURSE SYLLABUS

AD-A058 793 COURSEWARE INC SAN DIEGO CALIF F/G 5/9
SH-2F LAMPS INSTRUCTIONAL SYSTEMS DEVELOPMENT. PHASE II.(U)
MAR 78 A S GIBBONS, J P HYMES N61339-76-C-0055
UNCLASSIFIED NAVTRAEQUIPC-76-C-0055-1 NL

4 OF 4
AD
A058 793

END
DATE
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PART 1: INSTRUCTOR TRAINING

UNIT 1: Introduction to the Training System

LESSON 1:* Squadron Introduction

SEGMENTS:
1. Who's Who in the FRS and on Base
2. Orientation to FRS and Base Services
3. Squadron Policy
4. Student Characteristics and Background

LESSON 2: Introduction to the Training System

SEGMENTS:
1. Training Team Personnel Roles and Relationships
2. Student Syllabus and Student Flow
3. Instructor Duties
4. Instructional Presentation Types
5. Learning Center Operations

UNIT 2: Instructor Familiarization Flights (Optional)

NOTE: This unit is a placeholder for squadron optional use. The squadron must determine a policy on familiarization and check rides for new instructors.

UNIT 3: Operation of the Materials System

LESSON 1: Elements and Functions of the Training Organization

SEGMENTS:
1. Elements of the Training Organization
2. Function of the System Under the ISD Team

*This lesson may be administered by the squadron by squadron personnel or at the ISD team through their personnel or through mediated presentations.

LESSON 2: Scheduling Resources

SEGMENTS: 1. Scheduling Learning Center Media

2. Scheduling Instructor Time

3. TICCIT Scheduling (W. Coast only)

4. Trainer Scheduling

5. Aircraft Scheduling

LESSON 3: Operating Instructional Devices

SEGMENTS: 1. Operating the Tape/Slide Carrel

2. Operating the Videotape Carrel

3. Operating the Random Access Carrel

4. Operating the TICCIT Terminal (W. Coast only)

LESSON 4: Handling Device Problems

SEGMENTS: 1. Troubleshooting the Tape/Slide Carrel

2. Troubleshooting the Videotape Carrel

3. Troubleshooting the Random Access Carrel

4. Troubleshooting the TICCIT Carrel

LESSON 5: Handling and Storage of Media Equipment

SEGMENTS: 1. Handling and Storage of Tape/Slide Equipment and Materials

2. Handling and Storage of Videotape Equipment and Materials

UNIT 4: <u>Conducting Training</u>

LESSON 1: Monitoring the Learning Center

SEGMENTS: 1. SLC Procedures

2. Monitor Duties

3. Monitor Do's and Don't's

LESSON 2: Conducting Discussion Sessions

SEGMENTS: 1. Discussion Session Format

2. Discussion Session Do's and Don't's

LESSON 3: Conducting WST Exercises

SEGMENTS: 1. WST Session Format

2. WST Do's and Don't's

LESSON 4: Conducting Aircraft Flights

SEGMENTS: 1. Flight Format

2. Flight Do's and Don't's

UNIT 5: Interpreting Student Data

LESSON 1: Testing and Record-Keeping

SEGMENTS: 1. Records Kept on Students and Instruction

2. Instructor Record-Keeping Responsibilities

3. Student Testing

LESSON 2: Interpreting Tests and Records

SEGMENTS: 1. Determining When Students Need Help or Advice

2. Types of Student Problems to Expect

UNIT 6: Materials Revision

LESSON 1: Interpretation of Data and Revision

SEGMENTS: 1. Revision vs. Materials Development

2. Revision Team Members and Duties

3. Determining When Segments Need Help/Revision

4. Determining the Amount of Revision Needed

LESSON 2: Using Mastery Test Data for Revision Segments

SEGMENTS: 1. Mastery Test Scoring

2. Interpretation of Mastery Test Data

LESSON 3: Using Attitude Questionnaires for Revision

SEGMENTS: 1. Administering and Scoring Questionnaires

2. Interpretation of Questionnaire Data

LESSON 4: Using Student Instructor Interviews for Revision

SEGMENTS: 1. Administering Interviews

2. Interpreting Interview Data

LESSON 5: Using Data from External Resources for Revision

SEGMENTS: 1. External Sources and Revision Data

LESSON 6: Revision Processes

SEGMENTS: 1. Revision of Workbooks

2. Revision of Tape/Slides

3. Revision of Videotapes

4. Revision of CAI

5. Revision of Performance Check Sheets

6. Revision of Tests

7. Revision of the Syllabus

PART 2: AUTHOR TRAINING

UNIT 1: Introduction

LESSONS: 1. Systems Approach Model

2. Instructional Objectives

3. Level of Content and Level of Behavior

4. Basic Instructional Components

5. Properly Formatted Test Items

6. Introduction

7. Graphics Form and Functions

UNIT 2: Authoring Remember/Fact Segments

LESSONS: 1. Generalities for Facts

2. Instructional Helps for Remember/Fact Objectives

3. Practice Specifications for Remember/Fact Objectives

4. Lesson Specifications for Remember/Fact Objectives

UNIT 3: Authoring Use/Concept Segments

LESSONS: 1. Generalities for Use/Concept Segments

2. Instructional Helps for Use/Concept Objectives

3. Instance Specification Development

4. Lesson Specifications for Concepts

UNIT 4: Authoring Use/Rule Segments

LESSONS: 1. Generalities for Use/Rule Objectives

2. Instructional Helps for Use/Rule Objectives

3. Instance Specification Development for Use/Rule Objectives

4. Lesson Specifications for Rules

UNIT 5: Authoring Use/Procedure Objectives

LESSONS: 1. Generalities for Use/Procedure Objectives

2. Lesson Specifications for Procedures

UNIT 6: Graphics

LESSONS: 1. Types of Layout

2. Visual Weight

3. Graphics in Printed Material

4. Topography

UNIT 7: Lesson Materials Preparation

LESSONS:
1. Instructional Materials Review
2. Random Access Slide Development
3. Slide/Tape Lesson Development
4. Scripting Principles
5. Slide Layout Principles
6. Workbook Lesson Development
7. Printed Materials Layout Principles
8. Practice and Test Section Preparation
9. Example Section Preparation
10. Generality Section Preparation
11. Introduction Section Preparation

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